

FLIGHT

The
AIRCRAFT ENGINEER
AND AIRSHIPS

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Founder and Editor: STANLEY SPOONER

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DIARY OF CURRENT AND FORTHCOMING EVENTS

Club Secretaries and others desirous of announcing the dates of important fixtures are invited to send particulars for inclusion in this list:—

1932

- Apr. 15. National Aviation Day Display, Bedford.
Apr. 16. National Aviation Day Display, Ilford.
Apr. 16. W.R.A.F. Reunion Dinner at Criterion Restaurant.
Apr. 16. T.M.A.C. Dance at Suffolk Galleries, Suffolk St., S.W.1.
Apr. 17. National Aviation Day Display, Hanworth.
Apr. 20. Fencing: R.A.F. v. Army, at Aldershot.
Apr. 21. "Air Port Development," Lecture by N. Norman, before R.Ae.S.
Apr. 23. No. 45 Sqdn. R.A.F. Reunion Dinner at Crown and Cushion Restaurant, London Wall.
Apr. 26. Aero Golfing Society: Instone Challenge Cup, Berkshire G.C.
May 1. Northamptonshire Ae.C. Combined Motor-cycling and Flying Display.
May 1. Entries close at double fees for King's Cup Race.
May 7. Heston Spring Cruise begins.
May 7. Antwerp Aviation Club Air Display and Garden Party.
May 14. Coventry Ae.C. Air Pageant.
May 14-15. Skegness Air Pageant.
May 16. Northamptonshire Ae.C. Annual Pageant.
May 18. Household Brigade Flying Club Meeting, Heston.
May 21. "Morning Post" Cross-Country Air Race, Heston.
May 21-23. Scottish Flying Club Display, Moorpark, Renfrew.
May 22-30. Conference of Transoceanic Aviators at Rome.
May 25. Opening of Royal Tournament, Olympia.
May 28. London-Newcastle Air Race for "Newcastle Evening World" Trophy.
May 27-28. Brooklands Meeting.
June 4. Bristol Airport Summer Flying Meeting.
June 4. Cardiff Flying Meeting.
June 4. Leicester Ae.C. Flying Display and Motor Gymkhana at Ratcliffe Aerodrome.
June 5. Reading Ae.C. At Home, Woodley Aerodrome.
June 11. Leicester Ae.C. Meeting, Desford.
June 11. Close of Royal Tournament, Olympia.
June 18. Hull Air Display.
June 21. Aero Golfing Society: "Flight" Challenge Cup, Bramshott G.C.
June 21-28. Blackpool Air Pageant, Stanley Park.
June 25. R.A.F. Display, Hendon.
June 25-26. International Tourist Rally, Boulogne.
July 2. Opening of Portsmouth Municipal Aerodrome.
July 2-3. International Tourist Rally, Rheims.
July 3. Husbands Bosworth Flying Meeting.

EDITORIAL COMMENT



WE have from time to time briefly recorded what it has been possible to glean about the schemes of the two American companies, Pan-American Airways and Trans-American Airlines, for running an air service from the American continent to Europe via Canada, Greenland, Iceland and the Faroe Islands. At present, we understand, the scheme is held up because the Government of Denmark is unwilling to grant the special concessions in Greenland which are desired. Political difficulties are, however, sometimes overcome, and a scheme need not be dismissed from the realm of possibilities because an agreement has not been reached in international bargaining. This Arctic scheme is an interesting one to study, though the details of the service are not yet accurately known.

In the first place this route is not likely ever to be popular with passengers. It must be regarded purely as a mail route. This is in reality a point in its favour. An airway which sets about its business with a single eye to mail traffic will avoid all sorts of hampering considerations. It will use special types of aeroplane, and its "hotel equipment" at ports of call will be of a simple nature. Pilots, of course, can be found who will undertake to put up with any amount of discomfort and difficulty, and wherever a pilot can undertake to fly an aeroplane, there mails can be transported, though passengers may find the route impossibly unattractive. On the other hand, a service which is concerned solely with mails has certain obligations which are not present in a combined mail and passenger service. The speed of the mail service must be much greater, and the need for regularity is much more stringent. If bad weather lies ahead of a passenger aeroplane, the pilot may refuse to start, explaining that he is considering the advantages of the passengers themselves. A traveller in a hurry may be annoyed at this, and may refuse to travel again by that airway. Another less exacting passenger will be found to take his place. But if mails are late, there is sure to be a penalty clause in the contract which will have to

be met. If the service becomes consistently unreliable, the mail contract is not likely to be renewed, and then the air company will be ruined.

An air service along the route which we have outlined above will have to face and overcome some of the phenomena of nature which are least appreciated by the air pilot. Wide sea crossings will have to be made, and the sea in the North Atlantic is not invariably like a mill pond. Floating ice does not add to the attractions of a forced landing on the water. Gales of wind, we understand, are not uncommon. Worst of all is the prevalence of fog. The cold will be intense at some periods of the year. The proposition is not altogether attractive from the point of view of the pilot.

Aircraft design, however, and aids to air navigation have now reached a point where very great natural difficulties can be overcome, provided that the prize is great enough to justify expenditure on elaborate equipment. Though flying boats have not yet reached a stage when they can ride out a heavy storm on the surface of an ocean, yet forced landings can be avoided altogether if sufficient reserve power is provided. Flying by instruments in conditions of zero visibility is now a fine art, and the automatic pilot is another device which makes the pilot almost independent of his eyes. When directional wireless can be used (some storms make it ineffective) it will also do wonders in helping the blinded pilot. Even landing blind does not now seem to be an utter impossibility, provided the organisation is sufficiently elaborate. We must admit the possibility that aircraft could get through even the vilest weather known in this world. It would cost a lot of money to make this certain, but the mail contract would have to pay the cost. If the Post Offices of the United States, Canada, and the principal European countries were once assured of the reliability of the Arctic air service, they might well think it worth while to grant very remunerative contracts for the speedy carriage of letters between the two continents. In estimating the speed of that carriage, we must also consider the possibility of flying by night. If visibility by day is nil, then conditions by night cannot well be any worse, and the devices which make flying through dense fog possible can also be applied to night flying. The airway, once it had been successfully established, ought to save a lot of time on the most profitable mail service in the world.

The longer an airway is, provided that it does not close down at night, the more valuable it becomes. A trunk route gives a great value to branch lines which by themselves might not be worth the cost of operation. Mails brought speedily from America to Europe would make some European air lines really useful which are now subsidised for other reasons. The distribution of those mails might also call new services into being which otherwise could hardly be started at all.

It seems probable that the Arctic air route, if it is ever started, will run from Iceland *via* the Faroes and Shetland Islands to Norway. That might make it worth while to run an air service from the Shet-

lands down Great Britain to London. In present circumstances we are, we must confess, somewhat pessimistic about the possibilities of internal airways in the British Isles. As a unit, these islands are hardly large enough to permit an airway to compete on favourable terms with a railway. Aircraft has always shown to best advantage when not in competition with a railway—at least with a good railway—and particularly when passenger traffic is considered. Passengers, of course, cannot profitably be flown by night. Air services which have tried to compete with a good railway for passenger traffic have not been successful, though subsidies may have concealed the fact of the failure. One of the latest instances of this has been the closing down of Australian National Airways, Ltd. This firm, which received no subsidy, did well enough on the run between Sydney and Brisbane, where it was said to offer distinct advantages over the railway, but it could not hold its own on the section Sydney-Melbourne, where the attractions of the railway were superior. The few attempts hitherto made at internal air services in the British Isles have not given encouraging results.

If, however, it were a question of handling mails brought at great speed from America to Shetland, it might prove to be worth while to establish a somewhat elaborate and expensive service from the Shetlands to Croydon, so that the speed of the trunk route should not be dissipated during internal distribution. It has been shown that the advantages of the air mail to Karachi have been considerably nullified by the absence of an air service on to Calcutta. So, there would be comparatively little advantage to Great Britain in bringing the mails at a great pace from New York and Montreal as far as the Shetlands, and then wasting time by a leisurely delivery to Manchester, Birmingham, and London.

Flying in the British Isles does not present quite such terrific problems as are presented by the North Atlantic; but our climate is not without difficulties in the way of regular delivery of air mails. The attitude of the General Post Office is that regularity in carriage of mails is more important than occasional but unreliable speed. Our fogs are not of the same order as the fogs off Greenland and Iceland, but still, if we are to have a mail air service, the aircraft must be able to get through those fogs when they occur. The organisation would need to be almost as elaborate as that between Canada, Greenland, and Iceland, and it would not be cheap. The question is, would the General Post Office offer a mail contract sufficiently generous to enable the contractors to provide all the devices which enable an aeroplane to travel unerringly through storm and fog? The Post Office would do so if it thought that the demand from the commercial community was sufficiently strong. That community is rapidly learning to become airminded, and to realise that the speed of aircraft can help its business. It is quite conceivable that in the event of an air mail from America calling at the Shetlands, the necessary demand from the British business community might be forthcoming.



The Airspeed "Ferry"

3 DE HAVILLAND "GIPSY" ENGINES

WHEN work on the rigid airship R.100 ceased, the technical staff had to look around for positions elsewhere. Fortunately, the majority were able to secure work with various aircraft firms, while at least two, Mr. N. S. Norway, who had been chief designer to the Airship Guarantee Company for a time, and his chief assistant, Mr. A. H. Tiltman (some years ago connected with the de Havilland Aircraft Co.), decided to establish their own aircraft company, as it was felt that there was still room for a firm to produce aircraft of a type not hitherto introduced on the aircraft market. Norway and Tiltman succeeded in interesting Lord Grimthorpe in their undertaking, and the company was established under the title Airspeed, Limited, with works and offices at Piccadilly, York. Sir Alan Cobham also joined the board of directors.

Since their establishment the firm has been working away quietly on a machine of novel design. The first machine has now been completed and flown, and is at present at Martlesham undergoing official tests. It is known as the "Ferry," and it is believed that many of its unusual features owe their origin to the wishes of Sir Alan Cobham, who wanted some machines specially suitable for his forthcoming tour of the country. High performance and long range were not a necessity, but a large number of passengers for a limited horse-power was. Consequently Messrs. Norway and Tiltman designed a machine which has, as they express it, "a large cabin and a small petrol tank." When we say that this machine is designed to carry 10

paying passengers on a total of 360 h.p., or 36 h.p. per paying passenger, it will be realised that here should be a machine very economical to operate, while the three-engined power plant, with such reliable units as the Gipsy II and III, should rule out entirely the risk of a forced landing. From Sir Alan Cobham's point of view, the use of the "Ferry" will also have the advantage that it will show its passengers something of a three-engined

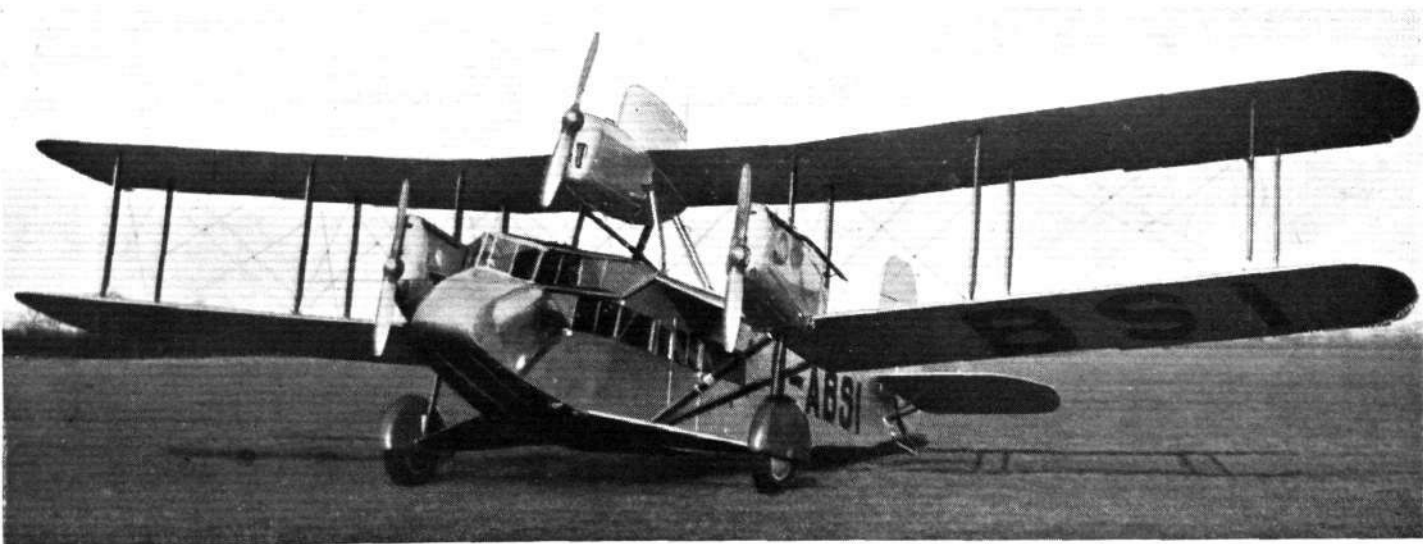
passenger aeroplane on a slightly reduced scale, and thus give them an idea of what the air line machines are like to fly in. The multi-engine idea has already become deeply rooted, and many will go up quite gladly in a three-engined aircraft who would hesitate to entrust themselves to a single-engined type. For joy-riding, three engines are, perhaps, not strictly speaking necessary, but considerations of the outlook of potential passengers are well worth studying.

The functions of the "Ferry" are not, of course, confined to joy-riding. For air routes on which the traffic is not great, such a machine might be usefully employed, the carrying capacity being good and the cruising speed enough for many purposes.

In the table of data most of the relevant characteristics of the "Ferry" are set out in a form convenient for reference. It will be seen that the machine is not a particularly small one, the wing span being 55 ft. and the wing area, including that

enclosing the undercarriage axles and radius rods, being 641 sq. ft. The normal gross weight is 5,400 lb., of which something like 2,100 lb. is disposable load. This

AIRSPEED "FERRY"				
Three "Gipsy" Engines				
Dimensions			ft. in.	m.
Length o.a. ..	..	..	39 8	12.1
Wing span ..	..	..	55 0	16.76
Wing chord ..	..	..	5 9	1.75
Wing gap | ..	..	..	6 0	1.83
Overall height ..	..	..	14 3	4.35
Wheel track ..	..	..	14 2	4.32
Areas			sq. ft.	m ² .
Main planes (including ailerons) ..	..	..	610.5	56.75
Ailerons (total) ..	..	..	62.8	5.84
Undercarriage planes ..	..	..	30.4	2.83
Fin ..	..	..	9.7	0.9
Rudder ..	..	..	21.9	2.03
Tailplane ..	..	..	39.4	3.66
Elevators ..	..	..	26.1	2.43
Weights			lb.	kg.
Machine bare ..	..	..	3,300	1 500
Disposable load ..	..	..	2,100	955
Normal gross weight ..	..	..	5,400	2 455
Wing loading ..	8.43 lb./sq. ft.	(41.6 kg./m ² .)		
Power loading ..	15 lb./h.p.	(6.83 kg./CV.)		
Performance (Estimated)				
Maximum speed near ground ..	..	..	112 m.p.h.	(180 km./h.)
Stalling speed ..	..	..	49 m.p.h.	(79 km./h.)
Initial rate of climb ..	..	..	800 ft./min.	(4.06 m./sec.)
Rate of climb at 10,000 ft. (3 050 m.) ..	..	..	370 ft./min.	(1.88 m./sec.)
Service ceiling ..	..	..	15,500 ft.	(4 720 m.)



THE "FERRY": Unusual Features are the placing of the central engine, the raising of the lower plane wing roots, and the winglet enclosing the axles and radius rods. (Photo. by courtesy of the "Yorkshire Herald.")

corresponds to a disposable load of over 5.8 lb./h.p. When the machine is used for flights of short duration, a very large percentage of this load can, of course, be in the form of pay load.

The constructors of the "Ferry" realise that when the machine is to be used outside England, the potential purchaser will quite naturally wish to know something of the sorts of pay load he will be able to carry, assuming one of the three engines to break down. On the assumption that normally fuel for 5 hours at cruising speed will be carried, and that in case of an engine failure petrol may be jettisoned to reduce the quantity to enough for two hours with two engines running, two examples have been worked out by the designers, one for continuing the flight at 5,000 ft. altitude and the other for 8,000 ft. altitude. In both cases the estimated figures were, of course, based on these altitudes over England.

The calculations indicate that the "Ferry" will maintain a height of 5,000 ft. on two engines when the gross weight is 5,060 lb. At this weight the rate of climb at 5,000 ft. is 50 ft./min. As the bare weight is 3,300 lb., and pilot, fuel and oil for 2 hours account for 460 lb., there is left a pay load of 1,300 lb., which could, for instance, be allocated to seven passengers of 165 lb. average weight, and would leave 145 lb. for luggage.

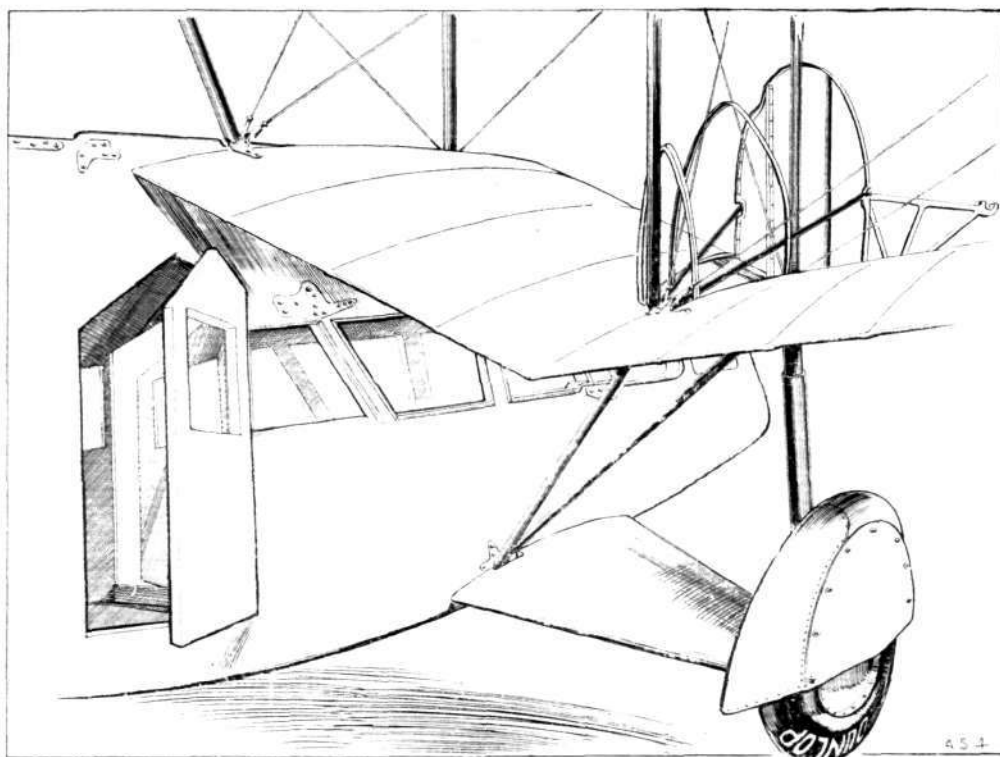
For the machine to be able to fly level on two engines at 8,000 ft. it is estimated that the gross weight should not exceed 4,670 lb. This means that the number of passengers should not be more than five, and there would then be a reserve of 85 lb. for luggage.

If one of these two contingencies is stipulated by the user of the "Ferry," the figures for normal flight with all three engines running become:—

For the 5,000-ft. case: Seven passengers, 5 hours' cruising, and a gross weight of 5,602 lb. This is in excess of the normal C. of A. gross weight of 5,400 lb., and represents an overload of 200 lb. However, it is claimed that no difficulty would be experienced in taking the machine off at this weight, but modifications to the structural C. of A. would be necessary.

For the 8,000-ft. case, the figures would become: Five passengers, 5 hours' cruising, and a gross weight of 5,212 lb. This figure is well within the gross weight of the machine.

It is pointed out that if the altitude for the two engines' case were in the tropics, the five passengers at 5 hours' cruising range would probably be the load normally carried. These figures are estimated, and actual flight tests are still required before they can be definitely confirmed.



NOVEL FEATURES: The lower plane roots are raised to the top longerons. A winglet encloses the wheel axle and radius rod, and is hinged to the fuselage. The cabin door arrangement, the wing engine mounting, and the "spats" over the wheels are other features illustrated. (FLIGHT Sketch.)

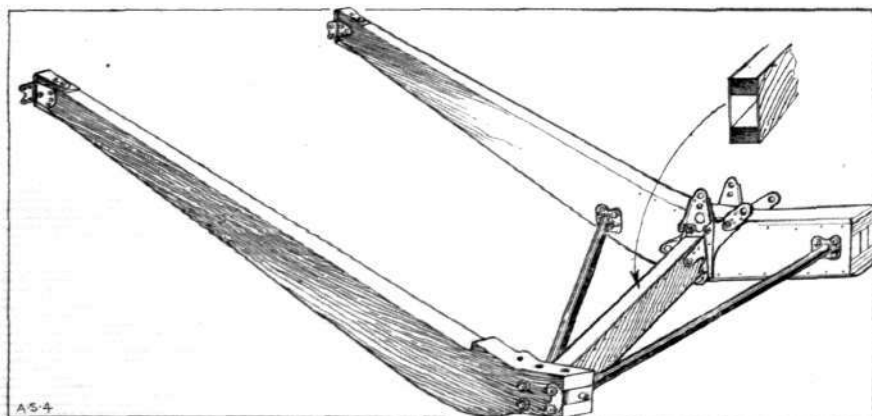
In the table of data estimated performance figures are given. These are based upon the normal gross weight of 5,400 lb. If the machine is flown with half-load only, so that the gross weight becomes 4,550 lb., it is estimated that the stalling speed would be reduced to 45 m.p.h., while the initial rate of climb would become 970 ft./min. and the service ceiling 17,500 ft.

The above figures, while still requiring experimental verification, do give an idea of the probable capabilities of the "Ferry." If the machine is used in Great Britain or Northern Europe, and a duration of less than 5 hours is sufficient, there should be no need to worry unduly about its ability to find a suitable landing ground on two engines and at low altitude, even when carrying the full complement of 10 passengers.

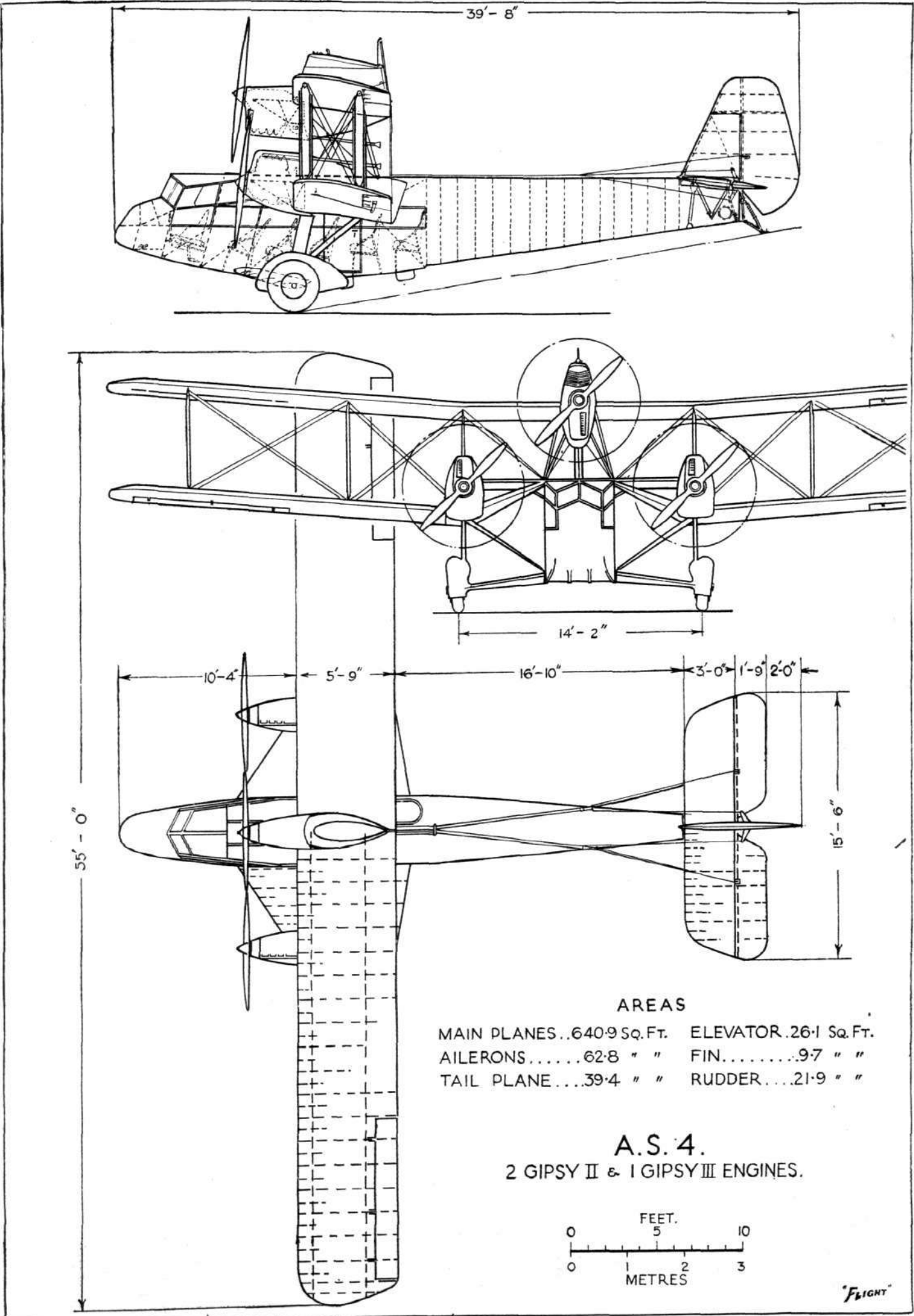
In design the "Ferry" is mainly unusual on account of its engine arrangement. All three engines are tractors, but one, instead of being placed in the nose of the fuselage, as is usually the case, is mounted in the centre of the upper wing. The other two engines are placed in the orthodox positions on the lower wing. Another innovation is to be found in the small triangular wing which, on each side, encloses the wheel axle and radius rod. These two small surfaces have a total area of 30 sq. ft., and it is expected that they will contribute sensibly to the lift, especially when the machine is landing, when it is thought that these two winglets should give quite a considerable "cushioning" effect. A practical advantage of the placing of the engine in the top plane is that the pilot's view is particularly good, a point of great importance in a machine to be used for joy-riding, when take-offs and landings are numerous.

Structurally the "Ferry" is a very simple straightforward machine mainly of wood construction. The fuselage is a flat-sided *monocoque* consisting of a spruce skeleton covered with three-ply birch. The wings have box spars with spruce flanges and three-ply walls, while the ribs are also of wood. The compression struts of the internal drag bracing are steel tubes.

The engine installation, apart from the placing of one engine in the top plane, is unusual in that the three engines are not of one type. The outboard engines are "Gipsy II's," while the top engine is a "Gipsy III" inverted. This choice was made because the inverted engine "worked into" the design better in the



The details of the raised lower wing root are illustrated in this sketch. The spars as well as the compression member are of box section. The wing engine is carried on bearers projecting forward from the front spar. (FLIGHT Sketch.)



THE AIRSPEED "FERRY" : General Arrangement Drawings to Scale. The engines are two "Gipsy II" and one "Gipsy III."

top plane, while in the case of the wing engines the upright type suited the arrangement best. In any case, many of the spares for the two engines are identical, so that the operator of a "Ferry" will not be called upon to increase his stock of spares to any serious extent.

The petrol tank is of streamline form and mounted above and behind the central engine. In this position it affords gravity feed to all three engines, even when the machine is climbing steeply with the tank nearly empty. For rapid filling such as is essential in a machine with relatively small petrol capacity and used for joy-riding, a 1½-in. diameter pipe line has been installed, which connects to a union on the side of the fuselage, the upper end of the pipe passing through a flange in the sump of the tank and discharging into the highest point of the tank. A sight gauge of the glass tube boiler type is fitted into the rear end of the petrol tank, and shows at a glance the amount of fuel in the tank. This gauge is for use by the ground engineer only. A Smith's petrol gauge (remote electric type) is provided for the pilot.

The undercarriage is of the "split" type, and, as already mentioned, the axles and their radius rods are enclosed in winglets hinged to the fuselage. The shock absorber legs contain coil springs giving a travel of 4 in., while the special oil damping gear gives a further travel of 6 in. The spring and the oil work in series, and the degree of oil damping is adjustable. The wheels are

Dunlops (35 in. by 8 in.), and Palmer hydraulic brakes are fitted. The wheels are partly enclosed in "spats."

All control surfaces are of orthodox design, and the ailerons (fitted on both upper and lower planes) have "Frise" balances. All bearings are fitted with ball races.

The cabin measures 12 ft. 7 in. in length, 3 ft. 9½ in. in width, and 5 ft. 9 in. in height. There are two doors, one on each side, and in the forward wall another door communicates with the pilot's cockpit. In the roof towards the rear there is an emergency exit, while the pilot's cockpit is provided with an emergency exit on the starboard side. The cabin floor is only a little more than 1 ft. above the ground, so that passengers find it particularly easy to step in and out. Owing to the fact that the lower wing roots are sloped up to the top longerons, the view from the cabin outward and downward is good.

Seating accommodation will depend upon the requirements of the particular operator. For a full complement of ten passengers, eight of the seats are placed along the sides of the cabin, with a gangway between. Against the back wall there is a sofa seat for two.

Particular attention has been given to the view obtainable from the pilot's cockpit. Owing to the absence of a nose engine, the view forward is good, as also outwards and downwards. The wing engines are so far behind the pilot that, although he can see his airscrews, the engines themselves do not cut off any useful arc of view.



National Aviation Day Display

SIR ALAN COBHAM launched his "National Aviation Day" Campaign before a representative gathering of the press at Hanworth Park on Tuesday, April 12.

The first thing to catch the eye was some of the fleet of motor-cars and lorries which forms the ground transport. Most of the cars are Austins, and both they and the lorries, which house the heavier equipment, including the broadcasting van, are painted in a very attractive colour scheme, wherein the main body work is cream, with green wings and wheels. This was designed by Lady Cobham, and it undoubtedly forms a most attractive background for the aircraft. It is touches like these, invariably more effective when of feminine



Sir Alan Cobham who is responsible for the National Aviation Day Campaign.

origin, which lend a distinctive note to the whole outfit, and we feel sure that Lady Cobham is responsible for a very large amount of the whole organisation.

Kolster-Brandes are providing and operating the public address apparatus, and their van, equipped in collaboration with Standard Telephones & Cables, Ltd., is surmounted by three vast loud-speaker horns which may be turned in any desired direction.

Acrofilms, Ltd., whose activities are well known to our readers, have a small van, and are providing many of those quick portrait cameras, the like of which are to be seen at any of our seaside resorts. Those taking flights are to be enticed to have their photograph taken and then mounted as an



Sir Alan and Lady Cobham surrounded by their pilots and other members of the organisation. (FLIGHT Photos.)

inset on a postcard of the aircraft. The refreshments throughout the whole tour are in the hands of Hamlin & Co.

As to the aircraft being used for the tour, many are, of course, well-tried types, but one at least, the Airspeed "Ferry," has barely made its maiden flights, and must therefore be looked upon as an unknown quantity. Few more rigorous ways of testing out an aircraft can be imagined than to send it on a joy-riding tour like this, and we shall watch with interest its behaviour during this time. Readers will find the "Ferry" described very fully on page 317 of this issue.

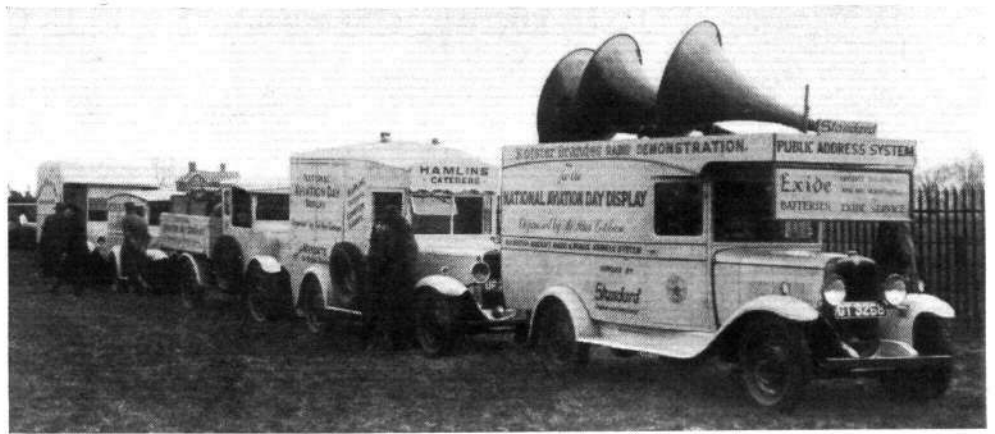
Other aircraft include an "Autogiro," Comper "Swift," "Martlet," Handley-Page "W.10," "Desoutter," "Moth," "Bluebird," and "Tiger Moth." Each of these will have its allotted part in the programme, and it is expected that besides these there may be others or duplicates of these, according to the demand for flights in any particular type.

Apart from power-driven aircraft, there will also be demonstrations of towed gliding, for which purpose Mr. Lowe-Wylde is accompanying the tour with one of his B.A.C. VII two-seater gliders.

Parachute descents will provide the "thrills" for the spectators, and Mr. Stewart, who performs this task daily, will use a Russell-Lobe chute for the purpose.

The actual programme will be not dissimilar to that to which we have already become accustomed by virtue of the great number of flying meetings there have been during the last two or three years, but there will, in addition, be many items not usually seen. The approximate programme, subject to changes as required, of course, is as follows:

FLY PAST, the loud-speaking equipment assisting by explaining the aircraft; FORMATION FLIGHT, led by the Airspeed "Ferry" with passengers on board; AEROBATICS, a "Tiger Moth" being



The heavy ground-transport is provided for by a series of different vans. In this group will be seen the public address equipment, the caterers' lorry, and that of Aerofilms, Ltd.



The parachutist still provides a certain attraction, and Mr. Stewart is here seen ready with his Russell-Lobe parachute on the wing of Sir Alan's D.H. 9.

used for this purpose which has been fitted for inverted flying; CRAZY FLYING; DANCING IN THE AIR, the pilot in this case will endeavour to fly in a "syncopated" fashion to music broadcast from the radio van, his Comper "Swift" being fitted with receiving apparatus; TOWED GLIDING; AN AIR RACE around pylons something on the lines of dirt-track racing; PARACHUTE DESCENT; INVERTED FLYING in the "Tiger Moth"; CONTINUOUS ROLLING in the "Martlet"; A SURPRISE ITEM; WIRELESS CONTROL, spectators will be invited to tell the pilot of the Comper "Swift," by means of wireless, what manoeuvre they wish him to do; AEROBATICS IN FORMATION; and a race between the "Autogiro" and a dirt-track rider.

During the day the A.A. Weather Reports will be relayed from the broadcasting van. Other attractions will include free flights for certain programme numbers, as drawn each day, and free flights for those winning a height-judging contest, which will be organised by the Kolster-Brandes people.

The first part of the Itinerary will be:—April 14, Morden Grange, near Ashwell, including Royston and Letchworth; April 15, Bedford, Cardington Aerodrome; April 16, Ilford, Goodmayes Park; April 17, Hanworth; April 18, Basingstoke, old Golf Course, Reading Road; April 19, Salisbury, High Post Aerodrome, Middle Woodford; April 20, Reading, Woodley Aerodrome; April 21, Maidenhead, Stroud Farm; April 22, Aylesbury; April 23-24, Walthamstow, Low Farm; April 25, Leyton Buzzard Flying Ground, Billington Road; April 26, Banbury Flying Ground, Warwick Road; April 27, Kidderminster, Hoo Farm, Worcester Road; April 28, Worcester, Derdiswell Park, Bilford Road; April 29, Abingdon, Black Horse Barn, Faringdon Road; April 30 and May 1, Stag Lane, Edgware and Hendon.



The fuel supply is of paramount importance on a tour like this, and throughout this National Benzole lorry will accompany the outfit to each aerodrome. (FLIGHT Photo.)



Municipal Aerodromes

A descriptive survey of the established Municipal Aerodromes which not only tells our readers what amenities are to be found at each place—both Flying and Social—but also gives information of particular value to those whom it is hoped will establish factories and works on the boundaries of these aerodromes

PERSISTENT propaganda in a variety of forms during the last five years has so far resulted in the permanent establishment of eleven municipal aerodromes, the definite purchase of suitable sites by ten other towns, and the expert inspection and reservation of ninety-six further sites. Today it may reasonably be said that practically every town of importance has evinced sincere interest in the project of a municipal aerodrome in addition to those which have been sufficiently enterprising to take the lead.

Whether the present result of the intensive propaganda is satisfactory to those who have been responsible for it, it is difficult to say. Certainly as far as the needs of aviation are concerned the result is but a beginning. Eleven municipal aerodromes are not likely to induce prospective promoters of internal airline schemes to make a start, neither should they appreciably swell the activities of air taximen. The latter no doubt still occasionally regretfully turn away an urgent fare because they cannot land within a reasonable distance of the desired destination. Unless our incurable optimism is playing havoc with our imagination, it seems to us that even in these times of unbridled economy the use of the air taxi would spread like a conflagration if every town could welcome air travellers with the ordinary facilities of a properly-equipped aerodrome.

That there would likewise be a great increase in the private ownership of light aircraft is also a matter not to be doubted. The lack of aerodromes is certainly restricting the flying hours of existing private owners and impels them to turn southwards for the Continent on the least provocation. From the airman's viewpoint our little islands still remain to be discovered.

This restricted internal air traffic of to-day probably disappoints those enlightened civic authorities who have established their aerodromes at considerable expense, but they must gently be persuaded from blaming the aviation authorities who induced them to take the step. They must blame the towns which have not hastened to emulate them.

The Influence of Joyriders

To those whose earnest propaganda inspired the present number of towns to establish aerodromes the result is not disappointing after five years' endeavour, particularly if the stringency of the times is borne in mind. If we mention the work of illustrious joyriders like Sir Alan Cobham and Capt. Charles Barnard we must also remind our readers that the years of touring round the country by the old-

established joyriding concerns such as Surrey Flying Services, the Cornwall Aviation Co., and Berkshire Aviation Tours, to mention but three, had already planted the seed of airmindedness. Their work in each town always received a good Press, and they never failed to exploit it as a pulpit for preaching the message of municipal aerodromes. They gave many civic officials their aerial baptism. Above all, they carried thousands of passengers with absolute freedom from casualties, which must have planted tremendous faith in their public. Fairmindedness must accord them first place in any consideration of those who have spread the gospel by practice rather than the spoken word.

FLIGHT itself has consistently devoted space to the subject, and in 1927 we voluntarily undertook a kind of survey of the country to collect all the available information about fields that had been used for flying during and since the war, in the hope of finding out how many could still be retained. With the valuable assistance of Maj. R. H. S. Mealing and Mr. C. B. Collins, of the Directorate of Civil Aviation, whose own expert advice has been liberally dispersed amongst towns interested in or indifferent on the subject, we were able to communicate with the owners or tenants of these fields and discover whether they were available or otherwise. Finally, a mass of information was collected, much of it naturally of a negative nature, and it was passed on to an authoritative body better able to make use of it. This survey enlightened us into the attitude towards aviation of the landing-owning class when their own acres were the subject of inquiry. In scarcely one case was the attitude unfavourable. We eventually concluded at that time that, as far as country aerodromes were concerned, they could be obtained easily and under most satisfactory terms.

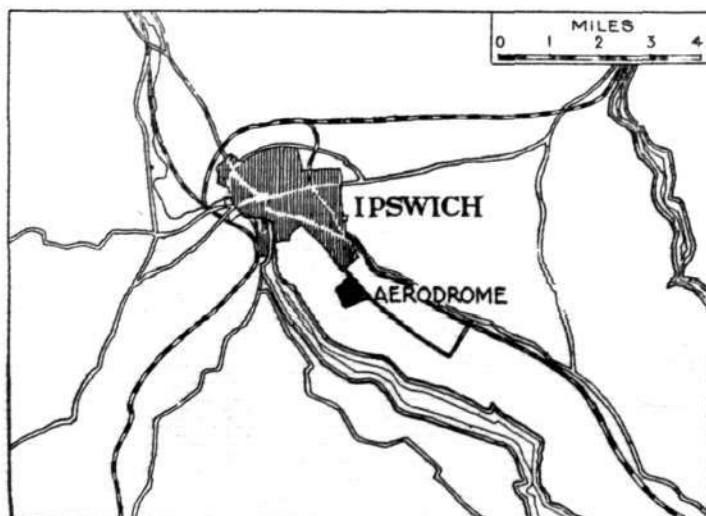
Descriptive Details

We have now collected descriptive details of the established municipal aerodromes and sites definitely purchased for immediate development, and we publish them below. In particular, we would draw the attention of existing and prospective aircraft manufacturers to the facilities offered for manufacturing by most of these municipal aerodromes. Assuming that the terms of tenancy are satisfactory, it is obviously advantageous to a new manufacturer or an aircraft repair concern to be able to establish works at a municipal aerodrome, for it will inevitably become a centre of considerable aerial activity. To be on the spot is half the battle in business.

IPSWICH

LYING to the south-east of the town, approximately $2\frac{1}{2}$ miles from the business centre, the municipal aerodrome at Ipswich comprises a site of 144 acres. A main road to the town is within 100 yards of the club-house, and along this operates a trolley 'bus service. Thus the aerodrome is as readily accessible for air travellers as the railway station usually is for rail travellers. Half-a-mile away to the south-west runs the River Orwell, and Felixstowe and the seaport of Harwich are not far away, so that the aerodrome is very convenient for aircraft setting off for the Hook of Holland and the Continent generally. The site is remarkably level and affords runways in all directions from between 800 and 1,150 yards in length. In altitude the site is 125 ft. above Ordnance Datum, with a sub-soil of sand and gravel, and a light, self-draining surface soil. Water never lingers on this surface.

There are two hangars available, each capable of housing three light planes, and one of the hangars is fitted with a work bench. Water and electric light are installed, and a licensed ground engineer is in attendance daily. The club-



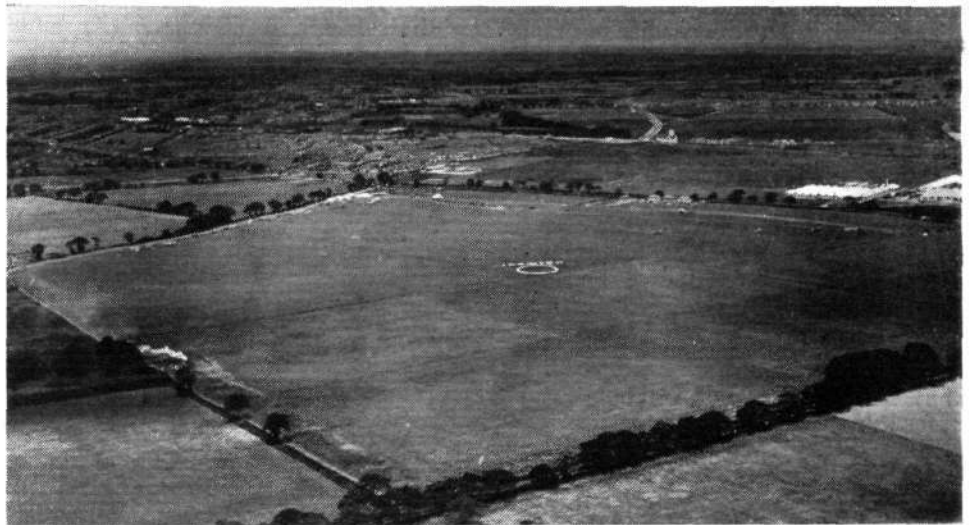
IPSWICH: A municipal aerodrome which adjoins the town and so shortens business men's trips.

house is fitted with a kitchen, and has a visitors' room. There is a telephone in the office, and the nearest telegraph office is a mile away. Space at the rear of the clubhouse has been paved for use as a car park. At present no night flying equipment is installed.

In the main the country surrounding the aerodrome is agricultural, and there is ample scope for the development of additional aerodrome buildings, offices, showrooms, works, etc. Two large works are already established to the north-east of the site.

Recently the Ipswich County Borough Council arranged with Brian Lewis & Co., Ltd., for that company to take over the aerodrome on a 21-years' lease. This company undertakes to encourage commercial air transport, air-taxi work, and the erection of buildings by firms interested in the manufacture of aircraft.

In order to assist the Suffolk Flying Club, which is at present using the aerodrome, Brian Lewis & Co. have granted the Club full facilities for flying until October, 1937.



IPSWICH: Of ample size, the Ipswich aerodrome offers exceptional advantages to manufacturers who realise the advisability of placing their factories amidst country surroundings, where real fresh air is available. (FLIGHT Photo.)

HULL

"THE Third and Cheapest Port in the United Kingdom," as Hull modestly advertises itself, is one of the important cities that has required very little prompting to express in practical terms the right attitude towards aviation. The City Council not only responded quickly to the plea for a municipal aerodrome but also organised a committee to advertise its aerodrome to the world and thoroughly investigate proposed air services to radiate from the city with responsible authorities like Imperial Airways, Ltd.

That no practical results in this connection have yet matured is certainly not the fault of Hull. Realising that none but an armchair critic should expect air services to be organised experimentally without financial assistance, Hull has been prepared to subsidise certain proposed schemes—an example of municipal courage worthy of special commendation.

These schemes failed to develop because in the opinion of Hull the lowest possible fares quoted were higher than the public could be expected to pay. Even a small service between Hull and Grimsby was not found practical for the same reason. But these disappointments have not damped local enthusiasm. It is realised that these stringent years have been against them and that disappointments are a part of all useful endeavours. They retain their faith in

the future of civil aviation, and their spirit of enterprise has not been diminished.

As soon as it is possible for Hull to have air services inland and overseas Hull will have them.

Hull has always been proud of its link with aviation in the Brough works of the Blackburn Aeroplane & Motor Co., Ltd., and they have wisely sought the guidance of experts like Capt. Norman Blackburn in their activities of recent years. As FLIGHT has already announced, there is now close co-operation between Brough and the University College and Municipal Technical School in Hull for providing aeronautical students with practical as well as theoretical training.

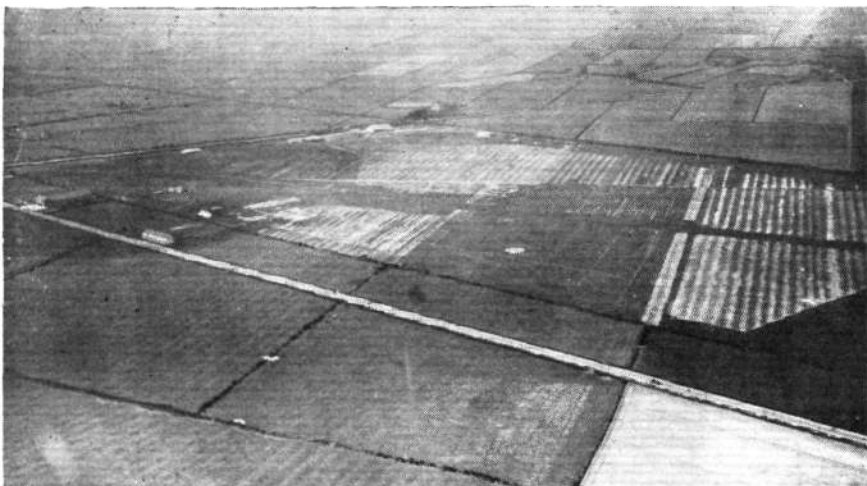
There were great expectations that aircraft manufacturing in the district would be augmented when the Civilian Aircraft Co., Ltd., established themselves at the municipal aerodrome to produce the Civilian "Coupé" monoplane, but this company has unfortunately ceased its activities, much to the regret of everyone concerned. One hopes that better fortune will attend the similar enterprises above the Humber in the neighbouring towns of Leeds and York, namely, the Arrow Aircraft Co., Ltd., and Airspeed, Ltd.

Hull has laid out its municipal aerodrome at Hedon, which is flat country lying to the east of the city. It is five miles from the centre of Hull and situated between the main road and the railway, and not far above the Humber, which is a good landmark in daylight. Approximately 200 acres have been made available, and quite recently further frontage land consisting of 17½ acres has been acquired.

Of the original area 119 acres have been levelled, cleared and drained, and 68 acres of this area are leased to National Flying Services, Ltd. About half of the 200 acres has been allocated for factories for aircraft manufacturing and allied industries.

N.F.S., Ltd., erected hangars, a workshop for minor repairs, a clubhouse, and lock-ups, for which electricity and water services are supplied. At the point on the Humber immediately south of the aerodrome is the site for a projected seaplane base. With the main road and railway flanking the aerodrome, and Hull's cheap and extensive docks only a few miles off, no manufacturer could wish for better export facilities.

From the flying viewpoint the surrounding country is favourable for forced landings. The Hull Flying Club receives its flying

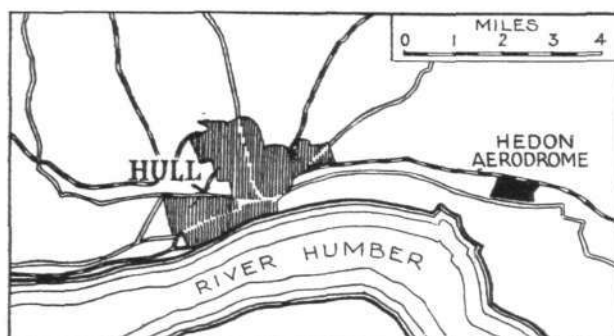


HULL: Few aerodromes have clearer approaches than Hedon, the municipal airport of Hull. (FLIGHT Photo.)

instruction and other facilities from National Flying Services, Ltd. In the immediate past the Club has not enjoyed the enthusiastic support that might be expected from a city of nearly 300,000 inhabitants, but a recent review of the situation followed by fresh endeavours have begun to improve matters.

Hull has been the scene of some of the inevitable tragedies of aviation—disastrous air raids during the Great War and the breaking up of R.38 over the Humber in 1921, for example—and it may have been slow in living such things down. The younger generation should have no memories of these experiences, but they may have been influenced by the older generation.

In addition to its instructional work, National Flying Services operate an air-taxi service as required. There is no night-flying equipment at Hedon as yet.



HEDON: Bounded by road and rail it is easy to reach Hull from Hedon aerodrome.

Omnibus services plying between Hull, Hedon and Withernsea pass the aerodrome. Hedon railway station is two miles away. Very few aerodromes are so close to their city as Hull's, and so convenient to reach. Being so near, the air visitor has never to worry about the prospect of finding accommodation overnight. There is an impression

amongst people who have never visited Hull that it is a dull and uninspiring place on account of it being tucked away in a corner of Yorkshire. It is certainly not a beautiful city, but it is not dull. Wide arterial roads now radiate from it and provide swift and easy exit and approach once the visitor has negotiated the level crossings. These anachronisms are the city's most annoying feature. When the long-mooted bridge is built across the Humber the city will have a more direct link with the south and will cease to hide in its corner.

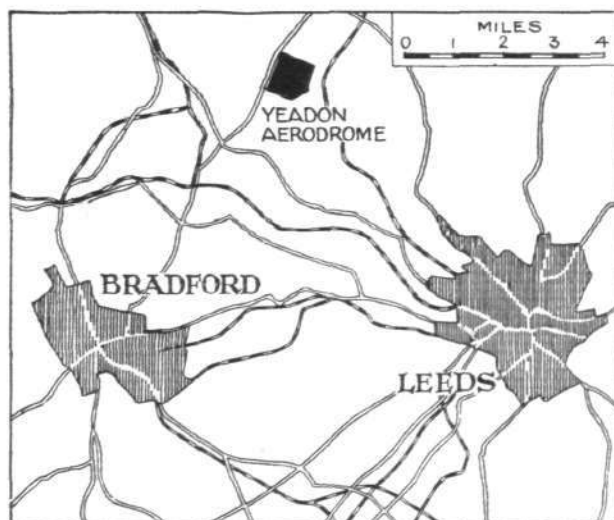
BRADFORD AND LEEDS

AS these two Yorkshire cities are only a mere $8\frac{1}{2}$ miles apart they share a municipal aerodrome, recently established at Yeadon, about $7\frac{1}{2}$ miles north-west of Leeds and seven north-east of Bradford. This equalising of the distances suggests admirable tact in the responsible surveyors! Both places must welcome the closeness of the site, for they previously relied upon Sherburn-in-Elmet for their flying activities, and that aerodrome is about 14 miles east of Leeds. Immediately after the war Leeds Corporation considered the possible use of one of the wartime flying fields in its neighbourhood as a permanent site, but in 1919 the idea of a joint aerodrome for the two towns was suggested, and representatives of both sought a site. Owing to the hilly nature of the surrounding country it was difficult to find a suitable area equidistant from both towns. Many sites were inspected and rejected for one reason or another, until in May, 1929, there was a mutual agreement about Yeadon.

Even then there were serious obstructions to be overcome. First, the site was intersected by a wedge-shaped piece of common land, 7.66 acres in area, and, secondly, two public footpaths of considerable local importance also intersected the flying area. Before Yeadon was finally selected, a series of meteorological observations was conducted, and its suitability relative to other sites in the neighbourhood was determined. Sir Alan Cobham was called in, and he inspected nineteen sites, including Yeadon, which he considered was the only suitable one for a joint aerodrome. Later, when the meteorological expert issued his report, it showed that thick mist, smoke, haze and fog were less frequent at Yeadon than at the other places where observations were taken. There had been a suggestion that the height of Yeadon (650 O.D.) might cause difficulty through cloud immersion, but the evidence obtained revealed that low cloud was not more frequent than elsewhere, and practical experience has confirmed this. During the past four months the reports from Yeadon show that the conditions there are better than elsewhere.

Development of the Site

In July, 1930, the purchase of 153 acres was made, and permission obtained from the Ministry of Agriculture and Fisheries to enclose the common land. Existing footpaths were diverted and levelling and clearing begun. An area of $11\frac{1}{2}$ acres, which had a slight fall towards the centre of the aerodrome, was mole drained, the method adopted being to turn back the turf with a horse-plough on the line of the mole drain and then run the mole-plough through by haulage between two traction engines. The turf was then replaced in its original position, with a certain amount of filling where there was any marked depression in the furrow. The remaining drainage work was carried out with tile drains. Some bad portions of the aerodrome, which had been cut by wheel transport, were ashed over as a temporary expedient, in order to allow of the use of the site as a landing ground in 1931. These areas will be turfed over as soon



YEADON: At a distance of only 8 miles from Leeds and 7 from Bradford, with good road and rail connections, Yeadon forms an excellent municipal aerodrome for both these cities.

as possible as there is considerable danger of the ashes being sucked up by airscrews, causing damage to the blades.

Before the initial work designed to render the site suitable was completed, the Aerodrome Committee agreed to grant National Flying Services, Ltd., a licence to use the landing ground. To open the Bradford Wool Fair, July 13, 1931, Prince George landed at Yeadon.

N.F.S., Ltd., were eventually granted a licence to use it for three years, with an option to renew the licence for a further period of seven years. The landing area was extended from 26 acres to 51 acres, two Corporation semi-detached houses, adjoining the aerodrome, were altered to form a club-house for the Yorkshire Aeroplane Club, and N.F.S. erected a hangar to hold twelve aircraft. In addition, two private hangars have been erected.

In its present state the aerodrome consists of 51 acres. A scheme of improvement has been prepared, and on its completion there will be available a runway of 600 yards in every direction. A possible future extension of the aerodrome on its eastern side has also been allowed for.

BRISTOL

H. R.H. PRINCE GEORGE opened the municipal aerodrome at Bristol on May 31, 1930, so that it has now been in operation for nearly two years. Local position: 3 miles S. by E. of Bristol and $1\frac{1}{4}$ miles W.N.W. of Whitchurch. The municipal property comprises 290 acres, of which nearly 150 acres are devoted to the landing area, the remainder being set aside for the erection of factories and workshops, connected to the aircraft industry.

The Corporation are prepared to let this area for such purposes on a long lease at exceptionally reasonable rates. Aircraft and aero-engine manufacturers settling thereon would be granted the free use of the aerodrome for demonstration and test flying.

There are three road approaches to the aerodrome from the city, and the main approach along a new arterial road brings the aerodrome within ten minutes' journey from the centre of Bristol. By means of this road the main railway station at Temple Meads is reached within ten minutes. From the southern side of the aerodrome Whitchurch (G.W.R.) station is one mile distant. For export facilities there are the city's docks three miles away, and in addition the Bristol docks at Avonmouth and Portishead within half-an-hour's journey. There are frequent regular sailings to all parts of the world from these docks.

Public supplies of water, electric light and power are available at any point on the aerodrome estate.

Existing Aviation Services

The present hangar accommodation can cope with all types of aircraft. One hangar contains private lock-ups for the use of the owners of light aircraft. All kinds of engine and aircraft

overhauls are undertaken by a branch of Airwork, Ltd., for whom special works have been constructed. Norman Edgar & Co., Ltd., have established an aircraft sales organisation in one of the aerodrome showrooms, and the Corporation are prepared to lease other showrooms for the display and distribution of aircraft and accessories.

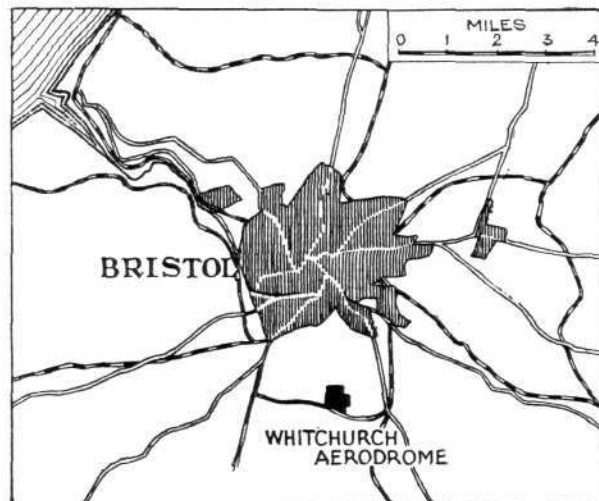
Phillips & Powis, Ltd., have a branch of their business at the aerodrome, providing an air-taxi service. Their air taxis can be chartered at short notice for any journey in the United Kingdom, Ireland, or to the Continent.

The Bristol and Wessex Aeroplane Club, Ltd., is responsible for the management of the aerodrome, besides operating the light plane Club and flying school. The Club possesses an excellent squash rackets court. In the main building is the restaurant and lounge, open to all who use the aerodrome, and providing breakfast, lunch, tea, supper and light refreshments.

Bristol is officially approved for inward and outward Customs clearance. Normally two hours' notice is sufficient to ensure the attendance of a Customs officer, although such attendance cannot be guaranteed unless 24 hours' notice is given.

Hourly meteorological reports covering the whole country are received from Heston, broadcast by the Automobile Association.

Night flying equipment is installed, consisting of obstruction lights on the buildings, aerodrome boundary lights, and a landing T formed by Money flares. At present no flood-lighting is available. Two hours' notice is sufficient when this equipment is needed, but in cases of emergency the equipment can be brought into use in shorter time. Finally, the Bristol Airport is open seven days a week throughout the year.



WHITCHURCH: A new arterial road is being run adjoining Whitchurch aerodrome which will place Bristol within a few minutes' drive.



THE OPENING: Bristol's municipal airport at Whitchurch when opened on May 31, 1930, by Prince George.

(To be continued)

Names of Towns on Gasholders

THE General Council of Associated Light Aeroplane Clubs has recently requested all Clubs to approach the municipal authorities in their districts to co-operate in a scheme of painting the names of towns on gasholders. In the County of Leicester, the Leicestershire Aero Club have been particularly active in this respect, with the result that the following towns are identified from the air by their names which appear on the gasholders:—Leicester, Bramstone, Belgrave, Syston, Mountsorrel, Melton Mowbray, Loughborough, Coalville, Ashby de la Zouch, Oakham, Hinckley, Kibworth, Market Harborough, Lutterworth, Sileby. In the Liverpool district the efforts of the Liverpool and District Aero Club have been successful at Birkenhead, Port Sunlight and Ellesmere.

Royal Air Force Assistance at Civil Flying Meetings in 1932

ON the recommendation of the General Council of Associated Light Aeroplane Clubs the Air Council has approved Royal Air Force support being accorded to the following three Civil Flying Meetings in 1932:—Brooklands Air Pageant, Brooklands, May 28; Hull Aero Club, Hedon, Hull, June 18; Portsmouth Municipal Aerodrome (Official Opening), Portsmouth, July 2.

Japanese Pilot Killed

CAPT. YOSHINORI NAGOYA, formerly of the Japanese Army, who had been preparing for a flight across the Pacific from Los Angeles to Tokyo, was killed when his aeroplane crashed at the Floyd Bennett flying field, New York, on March 29.

Airport News

Aerodrome and Airway Lighting

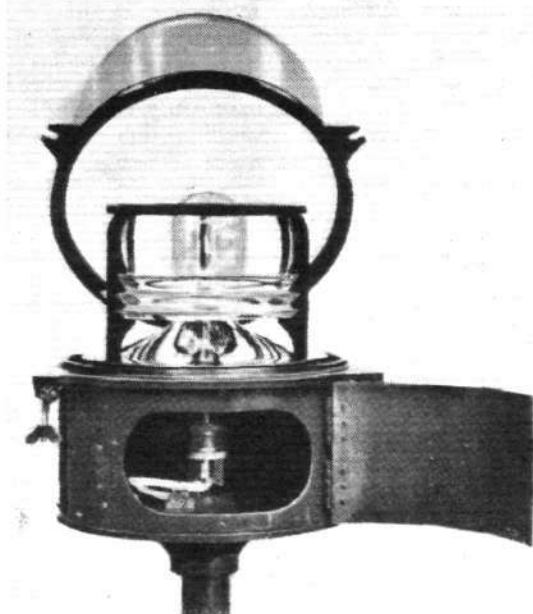
(Concluded from page 306)

AN INTERMEDIATE BEACON

ON the Near East route, water tanks at Diwaniyah and Ur junction have been used to carry intermediate type beacons. These are small beacons designed to mark the line of an air route between the large beacons. A 250-watt gas-filled electric lamp is used, the filament of which is placed below the centre of the lower half of a 200-mm. diameter dioptric lens. This raises the main beam slightly and ensures its visibility from a distance. A chromium plated mirror is fitted below the lamp and illuminates an arc of approximately 120 deg. above the horizontal. The beam up to the vertical is given by the unscreened lamp only.

The lamp, lens and mirror are completely enclosed by a heat-resisting glass dome, thus ensuring that the whole beacon shall be weather-proof. The candle-power of the main beam is 2,000 and its range approximately 18 miles.

Flashing mechanism can also be used with this type of beacon when it is desired that its identification from the air shall be made a simple matter. For use in out-of-the-way positions, where current is not available from electric mains, a small petrol engine generating set has been designed which can be started and stopped automatically at sunset or sunrise by a "Chance" light valve.



The Chance Intermediate Beacon is of sturdy construction and built on marine lighthouse principles, it should therefore be entirely weatherproof and require the minimum of attention.

ILLUMINATING THE CAIRO-KARACHI ROUTE

IN the clearer atmosphere of the East, it has been found possible to use beacons of a somewhat lower power than those already described. Five of these have been delivered for the purpose, and in utility they fulfil the same uses as that one installed at Lympne.

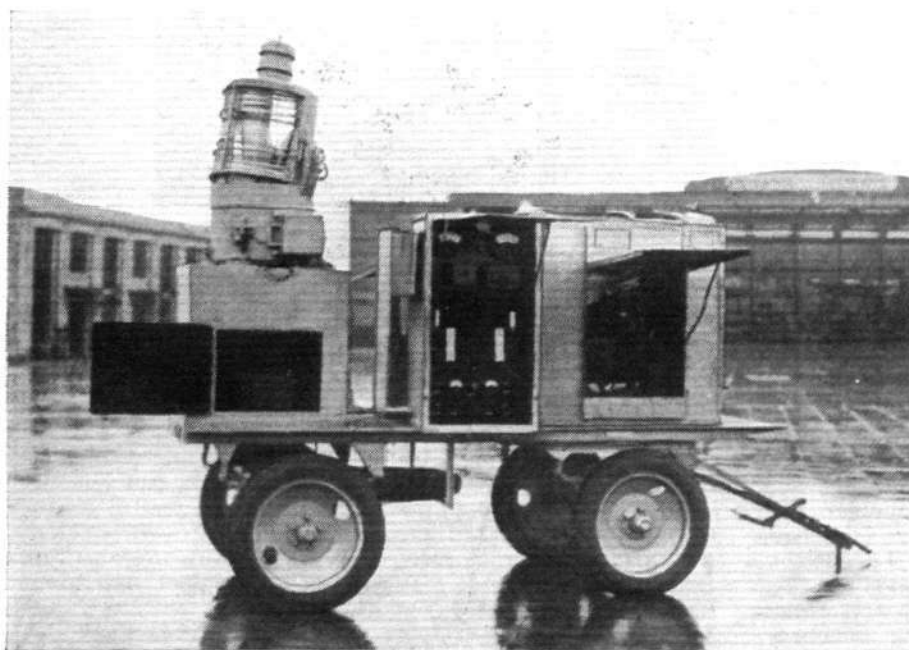
As the illustration shows, the lantern may be tilted and revolved as a beacon or used as a normal landing floodlight. The optic consists of a fourth order 500 mm. diameter fixed lens built up of ten refracting elements and a central belt. The illuminant is a 500-watt dual-filament lamp, with the normal spherical mirrors placed behind it.

The generating unit, of 6 kw. capacity, carried on the trailer, is run by a 10/20-h.p. Morris engine, thus rendering the whole unit completely self-contained. The candle-

power given through the lens is approximately 320,000, and the intensification obtained at a distance of 15,000 ft. under average conditions is 0.15 ft. candles. Similar floodlights to this have been used on the Salisbury aerodrome, Rhodesia, and M'Beya in Tanganyika.

WIND INDICATORS

TWO types of illuminated wind indicators are supplied, both taking the form of the letter "T" mounted



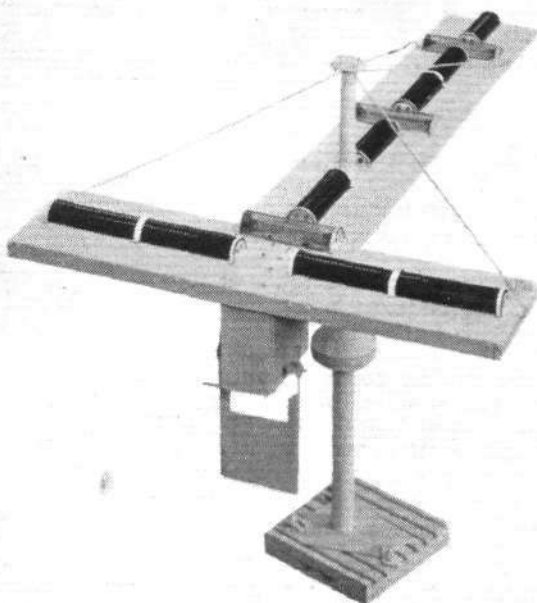
For the Indian Mail Route, dustproof self-contained units such as this Floodlight are imperative. As will be seen it is admirably compact and yet everything is readily accessible while the short wheelbase allows it to be manœuvred easily.



The "Chance" Wind Indicator at Croydon is lighted with Neon tubes and is very sensitive to changes of wind direction.

horizontally on a vertical steel structure and free to rotate with the wind. The first and largest, which has been installed at Croydon, is very sensitive and registers the direction of wind speeds as low as 4 m.p.h. A braking device is fitted whereby sudden variations due to cross gusts are interpreted without violent oscillations, while the whole "T" can be locked in any desired position so that the best landing direction can be indicated in a calm. Illumination at night is by means of Neon tubes, which outline the "T" placed in double rows, so that the failure of any tube still leaves unimpaired the continuity of the lines of light.

The smaller "T" is illuminated with a number of double-ended tubular "striplyte" lamps covered



with selenium ruby glass shades. An automatic wind velocity indicator is fitted, so that bars of white light are shown across the tail of the "T" according to the varying strength of the wind. For example, one bar may be illuminated for a 10-m.p.h. wind, two bars for a 20-m.p.h., and three bars for 30 m.p.h. or over. Both types are, of course, illuminated from the mains and the current is transferred via the structure to the "T" by means of slip-rings, the control in both cases being taken from any desirable point.

The new "Chance" wind-tee is designed for smaller or privately-owned airports and is equally as effective as the larger models though of less cost.

CROYDON

WE have just completed a week of the most squally weather experienced for a long time. Somehow or other March has got itself mixed up with April to such an extent that they have both been trying to outdo one another. Incoming machines have been subjected to severe buffeting and late arrivals have been the rule rather than the exception. However, in spite of the weather, services were fully maintained and passengers appeared to stand the ordeal better than if they had chosen the sea crossing. One pilot stated that the Channel, from the air, was one mass of seething foam, it being impossible to see any clear water.

Sir John Simon crossed to Paris on Sunday, although the weather was enough to make travelling of any sort far from pleasant.

A new fashion has been started by Imperial Airways' pilots in the form of growing beards. Both Messrs. Jones and Horsey have cultivated real Captain Kettle outfits, and others, not to be outdone, have bought false ones. Mr. Rogers in particular amused everyone very much by appearing in a false beard and moustache, the beard reaching well to his chest. The colour was decidedly ginger, so it should also act as a chest protector in the cold weather, by the warmth beards of this hue are credited with radiating. Mr. Mollard has returned from the East and is at present flying on the European services. Very little joyriding or instructional flying has taken

place this week owing to the squally state of the weather. The Luft Hansa night service has been maintained throughout the week, the only delay being in the arrivals here which have naturally been slightly late on several occasions.

The extension added during the winter to the flagstoned area in front of the Administration buildings seems to have definitely cured the dust problem which has been so prevalent and unpleasant during past years. The ground has been treated with a mixture of water and tar, which, when set, goes very hard. The real test will, of course, be when and if we get some really hot, dry weather, although there is every indication that the desired result has been obtained after much experimenting. The occupants of the offices facing the aerodrome will no doubt offer up prayers of thanks for being released from continual sand storms in the dry weather.

The mast of the new radio beacon has been painted red and white, but many are agreed that it is a dangerous obstacle, no matter what is done to make it conspicuous to pilots. There are always a certain number of mad-brained people who would hit anything, whether it be on the road or in the air. However, it is to be hoped nothing will try conclusions with it.

The traffic figures for the week were:—Passengers, 876; freight, 36 tons.

P. B.

HESTON

MONDAY, April 4.—We have had a week of consistent bad weather, but, in spite of this, the Flying School machines were in use at any time it became temporarily fit.

Mr. L. H. Stace, of Henly's, Ltd., at Heston, reported that while on his tour with the Swallow Convoy he gave flights on his "Avian" to the Mayor and Mayoress of Bournemouth, and afterwards flew the Mayoress to Portsmouth and back. We feel that no opportunity should be lost of gaining the interest of municipal authorities in aviation, and are glad to say that both the Mayor and Mayoress are now enthusiastic about flying.

TUESDAY, April 5.—Mr. Nigel Norman, a director of Airwork, Ltd., cleared Customs and left for Paris, with two passengers, on "Puss Moth" G-ABNC, loaned him by Brian Lewis & Co. He did not leave until 5 p.m. and did the journey in 1 hr. 52 min.

The Marquis of Douglas and Clydesdale arrived on his "Moth" from Scotland to resume his Parliamentary duties.

Miss N. M. P. Buntine, of Pietermaritzburg, who took her "A" licence at Heston School of Flying, called in to

say "Good-bye" before sailing for South Africa, and later in the day we received a call from two young South Africans—Mr. Rennie and Mr. Bradney—who, within one hour of their arrival had purchased a "Moth" (G-AAGI). Mr. Rennie had been passed out for solo and Mr. Bradney had his first lesson here.

FRIDAY, April 8.—Mr. Gordon Store, who accompanied Miss Salaman on her trip to Cape Town, arrived from Paris on "Puss Moth" G-AAXX to clear Customs.

Two private owners cleared Customs and proceeded to Paris.

Capt. Barnard cleared Customs and proceeded to Amsterdam on his well-known "Fokker" G-EBTS.

Lord Douglas Hamilton came to make arrangements for a machine in which to pass his night-flying tests for a "B" licence.

SATURDAY, April 9.—The Automobile Association Weather Bureau located at Heston would appear to have justified its existence at this early stage. Many private owners, some as far away as Newcastle-on-Tyne, have informed us that they always listen in to the weather broadcast before setting out on a journey. To-day we were told

of a motorist, entirely unconnected with flying, who always listens in before starting on any motor tour. We understand it is quite simple for any wireless set to be altered to be able to tune in to 833 metres, on which wave length the broadcast is made.

Blind flying is becoming very popular among lady pilots, and Miss H. Rendall took the air—under the hood—in the Airwork School of Flying machine specially fitted for this purpose.

Mr. B. Goldman, in G-EBQH, was certainly up with the lark this morning, as he cleared Customs before 6 a.m. and was off to Berlin soon after.

Mr. W. L. Runciman cleared Customs and proceeded to Paris in his "Puss Moth" G-ABLG. His journey to Paris is undoubtedly in a good cause, as he is to be married there on Monday next.

Mr. P. T. Eckersley, the Lancashire Cricket Captain, left in his "Moth" G-AABX for Lancashire.

We observed "Puss Moth" SU-ABE undergoing its air test this morning, before being transported to Cairo for the use of Misr-Airwork. Three further machines are being prepared for Misr-Airwork—SU-ABB ("Gipsy II"), SU-ABC ("Gipsy III"), and SU-ABD ("Gipsy III").

SUNDAY, April 10.—We are pleased to be able to announce the further concession promised by Airwork, Ltd., the owners of the Heston School of Flying.

On and from April 17 (the day on which the clocks are put forward one hour) the rates for flying instruction on Airwork machines will be reduced to £4 4s. per flying hour. This four guineas will include one half-hour free instruction in navigation at Capt. Ferguson's School of Navigation and navigation lessons may be booked in conjunction with flying lessons, so that pupils can deal with the two subjects at one visit. The charge for "blind flying" will be reduced to £4 per flying hour from the same date.

Capt. R. G. Cazalet arrived from Wexford in his "Puss Moth" G-ABDL and cleared Customs.

There were many visitors to Heston, but owing to the heavy rain flying instruction was practically impossible until after 5 p.m., when we noticed several members of the Brigade of Guards Flying Club practising for their landing competition to be held at their flying meeting on May 18.

Among the visitors were Lord Willoughby de Broke, in his "Klemm" G-ABBU. We were also glad to see once again Sir Robert Throckmorton, Bart., on his return from Canada.



Air Transport

Air Mails to Cyprus and Turkey

IN connection with the announcement last week that as from April 17 Imperial Airways airliners on the England-India service will call at Limasol, Cyprus, the Postmaster-General announces that the combined postage and air fee will be 3½d. for the first half-ounce and 2½d. for each additional half-ounce. The latest time of posting will be the same as for the Indian air mail—namely, 11 a.m. on Saturdays in the air mail letterbox outside the General Post Office, London, and correspondingly earlier elsewhere, and the mail will be due to reach Limasol the following Tuesday. The Postmaster-General also announces that the parcel post to Turkey, which was suspended in February last, has now been resumed. The importation into Turkey of many articles is, however, subject to special restrictions, by the application of a quota system.

Imperial Airways and Summer Time

OWING to the advent of summer time in France, Imperial Airways state that the Armstrong Siddeley airliners on the 8.30 a.m. Paris-London air service now leave Le Bourget at 7.30 a.m. G.M.T. and arrive at Croydon at 9.45 instead of 10.45 a.m., while the Handley Page airliners on the Silver Wing service leave Le Bourget at 11.30 G.M.T., reaching Croydon at 1.45 instead of 2.45 p.m. When British summer time comes into force on April 17 the services will then operate at 8.30 and 12.30 British summer time.

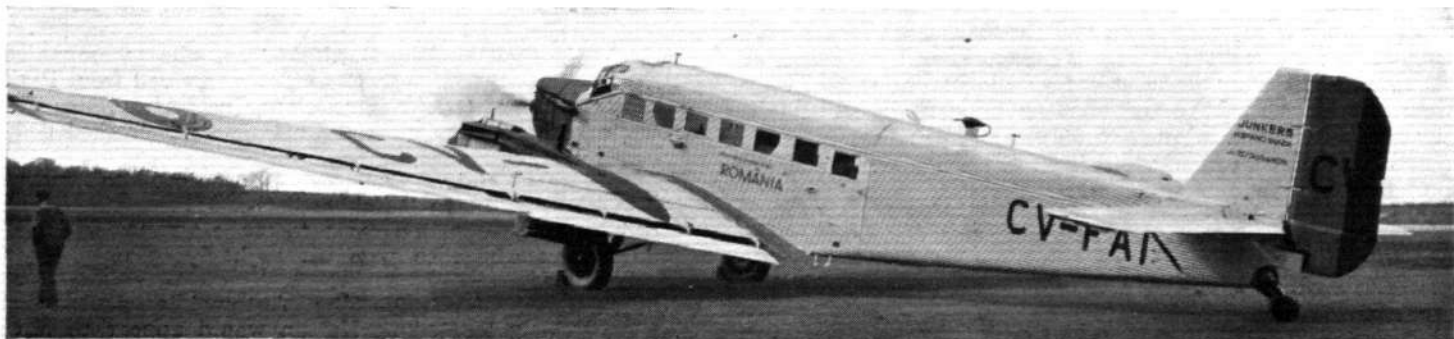
Transatlantic Air Services

MR. JUAN T. TRIPPE, a director of Pan-American Airways, has arrived in Europe for the purpose of discussing matters relating to his company's Transatlantic air service. We understand that he will confer with Imperial Airways on certain points, and will inquire into the question of a possible European terminal for the proposed service. He will also visit Paris and Berlin, and states

that while in England he hopes to inspect British aircraft and engines. It will be remembered that Pan-American Airways propose joining the Trans-American Airlines Corp. in connection with the projected Arctic air route between America and Europe via Iceland. We believe Mr. Grimson, of Detroit, representing the latter company, is also in Europe in connection with this service. Incidentally, the proposal for this Arctic air service has caused lively interest in Shetland, for it is hoped that Shetland will play an important part in the scheme. Inasmuch as the suggested route would lie from Detroit across Canada and Hudson Bay to a point in Baffin Land, across Davis Strait to Greenland, and on to Iceland, thence to the Faroe Islands, Shetland, and Norway, Shetland could thus form the junction for air connections to London and the Continent. The scheme, however, has received a temporary setback, for while the Icelandic Government recently granted a 75-year concession regarding the use of Reykjavik as a base and flying over Iceland, the Danish Government has refused the Trans-America Air Line a concession to establish bases for the route over Greenland, which is a Danish colony. The demands of the air line, it is stated, are considered unacceptable by the Danish Government.

"Graf Zeppelin"

REPAIRS to the slight damage caused by collision with a wireless mast when leaving Friedrichshafen having been completed, the German airship *Graf Zeppelin* made another start for Brazil on April 5, the second of this season's round trips across the Atlantic. Capt. Lehmann was in command, and in addition to a crew of 40, eight passengers—including a boy of five years—and mail were carried. The airship reached Brazil at 5.14 p.m. local time on April 7 and started on the homeward voyage to Friedrichshafen on April 9.



FOR BLAZING THE TRAIL: The Junkers J.52, "Romania," in which Prince George Bibesco, President of the International Aeronautical Federation, is carrying out a survey flight from Paris to Madagascar with a view to finding the shortest and most suitable air route, and to map out new petrol and supply stations.

Airisms from the Four Winds

A Furlough Flight

MAJ. WILLIAM JONES, Pilot Instructor to the Karachi Aero Club, is on leave. He left the Persian Gulf for Lympne, in Kent, on April 5, in a D.H. 80-A "Puss Moth" three-seated monoplane—not with any idea of establishing a record, but simply because he wanted to be sure of as much time in England as could possibly be secured. The only preparations made for his trip were the checking-up of points at which he could be sure of getting the necessary supplies of Shell petrol and Vacuum Mabiloil, on which Maj. Jones has made all his best trips. He will be returning to Karachi and duty, similarly by air, in September next, again to economise on the matter of time.

The "Biarritz" reaches New Caledonia

THE three French aviators de Verneilh, Max Devé, and Munch appear to have had bad luck at the very end of their splendid flight in a Couzinet 33 from Paris to New Caledonia. As recorded last week, they reached Longreach on March 29, and on March 30 the flight was continued to Brisbane. Here the aviators had to kick their heels until April 5, the weather reports from New Caledonia indicating continuous rains which would make landing impossible. However, on that date a start was made, and the 1,000 miles or so of open sea were flown without serious incident. Reports from then onwards are not very full nor particularly clear, but it appears that the *Biarritz* came to grief in New Caledonia. Whether during the actual landing or subsequently is not at present known, but it seems likely that the accident must have been due to the sodden state of the aerodrome. The three "Gipsy" engines seem to have done their work in the manner one would expect, for the de Havilland Aircraft Company have received from M. Couzinet the following telegram: "Vous remercie precieuse collaboration Gipsy III reussite voyage France-Nouvelle Calédonie avec mon trimoteur 33. Suis particulièrement heureux etre ainsi recompensé de ma confiance en exceptionnelles qualites de vos moteurs."

Disarmament Conference

At the Disarmament Conference at Geneva on April 11, Mr. Hugh Gibson, of the United States delegation, moved a resolution abolishing tanks, heavy mobile guns and gases. Sir John Simon said that Great Britain was prepared to co-operate whole-heartedly with the proposal, which was intended to induce a feeling of security by abolishing weapons which could overcome frontier defences. He thought Mr. Gibson had been wise to limit his proposals to land warfare, but corresponding questions of sea and air armaments would have to be considered also. When questions of air bombardment came up, it would be of great importance to determine whether the practical course was to direct attention to the machine or to the act, and whether one might not have to consider dropping bombs from the sky as a very suitable object for international regulations, in view of the difficulties in classifying machines.

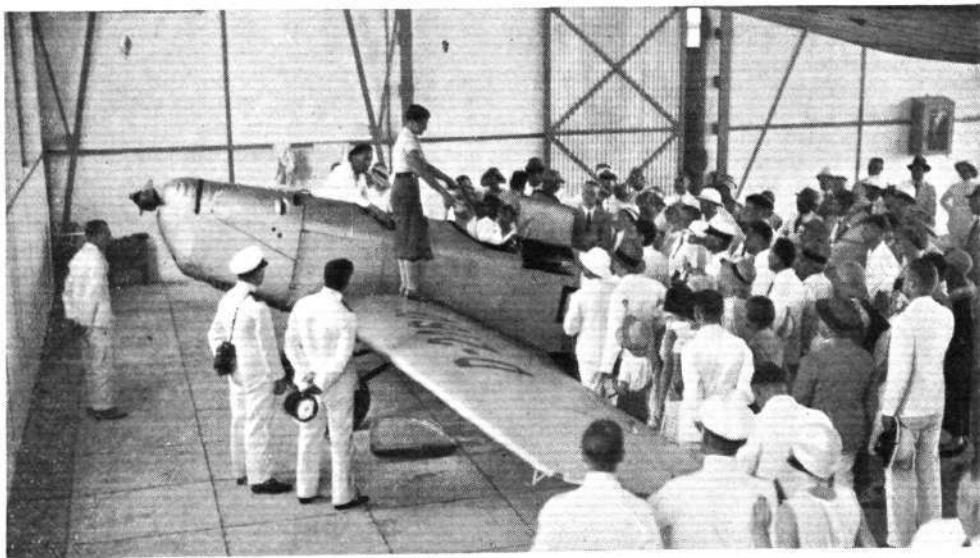
Sqd. Ldr. Booth leaves for Germany

SQD. LDR. R. S. BOOTH, late captain of R.100, has left for Germany on deputation to the Zeppelin works at Friedrichshafen, as Air Ministry representative, to study the new Zeppelin airship which is being built. Dr. Eckener has cordially invited him to fly to America on the next voyage of the *Graf Zeppelin*. At Friedrichshafen, Sqd. Ldr. Booth will be able to study the problems introduced by the use of helium gas in the new airship. It is said that a small amount of hydrogen will be carried in interior bags inside the helium bags, so that when valving is necessary, hydrogen can be let out, and the expensive helium can be saved. Probably Sqd. Ldr. Booth will afterwards visit the United States to study the *Akron*, and the new airship now under construction.

Fraulein Beinhorn's World Flight

As reported last week Fraulein Elli Beinhorn has completed her flight to Australia from Berlin, whence she set out on December 4 last. The accompanying pictures—for which we are indebted to Shell Mex & B.P.,

Ltd.—come from Sourabaya, and show (bottom) her Klemm L.26 (110-h.p. Angus) landing there, and (top) the German girl pilot addressing an interested group inside the hangar. Fraulein Beinhorn is now in Sydney, and we understand that she proposes to ship her machine to San Francisco, continuing her journey by air from that point to Pernambuco via Los Angeles, San Diego, Tucson, El Paso, Chihuahua, Mexico City, Guatemala, Nicaragua, Panama, Buenaventura, St. Lorenzo, Quito, Cuenca, Lima, Iquique, Valparaiso, Santiago, Mendoza, Rosario, Buenos Aires, Montevideo, Rio Grande do Sul, Porto Alegre, S. Paulo, Rio de Janeiro, San Salvador, Pernambuco. From that point she will return to Germany by boat.



Private Flying & Gliding

BROOKLANDS

Among the latest pupils taking the schools' blind flying course are the Hon. Richard and Mrs. Westenra, Miss Giles and Mr. Hast. The latest innovation at Brooklands is the provision of a shop on the aerodrome where helmets, maps, instruments and other flying kit may be bought. The helmet recommended will be one designed at Brooklands, and is said to combine perfect comfort with perfect hearing, a combination seldom found in most helmets.

Arrangements for the Air Display on May 27 and 28, which is being organised by the G.A.P.A.A.N., are now well under way, and replies received from manufacturers and others who are interested augur well for the success of the show. There will be a Press and Trade Day on Friday, May 27, when admission will be by invitation and ticket only. On the Saturday the flying programme will run for a full two hours and will, it is hoped, form one of the most entertaining and all-absorbing flying displays yet presented. Charges for admission on that day will be 5s. and 2s. 6d. per person (children half-price) and motor vehicles 2s. 6d. Private owners and others arriving by air will be admitted free. There will also be a special G.A.P.A.A.N. enclosure, admission to which will be by badge only. Those requiring further information or details of this enterprising event should apply to the Display Sec., c/o Brooklands School of Flying, Weybridge, Surrey.

THOSE DANGEROUS CABLES

Pilots flying to Scotland and intending to land on the landing ground near Gleneagles Hotel in Perthshire should note that high tension wires have now been erected in the vicinity. It will be seen, therefore, that this menace, which is so prevalent in the south of England, has already penetrated to the wilds of Scotland. The sooner something is done about this "Grid system" on routes used by aircraft, the better. It seems almost incredible, but the authorities responsible appear to go out of their way to make things more dangerous than they need otherwise be. For example, in many places where the cables are laid over a hill rather than go to the expense of an extra pylon half down the slope, they actually greatly increase the height of the pylon on the top of the hill, and, as this occurs in many places where the hills are often shrouded in mist, it is obvious that flying is soon going to become almost impossible except in the clearest of weather. In Kent, for example, on two occasions we recently found these high pylons on hills when flying from Folkestone to London. Now this is a route which may be followed not only by small privately-owned aircraft, but all large commercial machines, and anything more calculated to endanger these aircraft can hardly be thought of. If they must be run over the tops of hills, we should at least like to see conspicuous, bright yellow plates hung along the wires at intervals, much in the same way as corks are put on telephone wires when they run near shooting coverts.

SKEGNESS AND EAST Lincs AERO CLUB

Progress at Skegness has been rapid since the club was formed some two months ago. The extension and draining operations on the aerodrome are now completed, as well as the hangars and a petrol and oil station which serves both the main road and the aerodrome. For instruction the club has in use two Gipsy "Moths," while a "Puss Moth" is available for taxi work and joy rides. So great is the demand for this form of flying that an order has already been placed for a D.H. "Fox Moth." The weather during Easter seems to have been more favourable than in most places, and the club machines

were kept busy throughout the week. The club-house which overlooks the aerodrome is well fitted, and, besides the usual bar, lounge and dining room, has a spare bedroom for the use of visiting pilots, which latter are always welcome at the aerodrome.

THE N.F.S. "PUSS-MOTH" TAIL WHEEL

In FLIGHT for March 25 we illustrated the new tail wheel which has been fitted to Col. the Master of Sempill's "Puss Moth." Another owner who has also had one fitted to his "Puss Moth" is Mr. Lindsay Everard, and this is now giving great satisfaction. Taxying has been found a little peculiar owing to the fact that the tail offers almost no resistance, and with hardly any use of the brakes at all the machine may now be turned in its own length. Our caption stated that the Master of Sempill's tail wheel was made in the workshops at Hanworth. We have since been informed that this was not the case, and it was made by Aircraft Components, Ltd., of Cheltenham, the same company which is manufacturing the Dowty compression-leg or shock absorber strut for undercarriages, which was described on page 266 of the same issue.

SKEGNESS AIR PAGEANT

At the pageant, which is being held on May 15, all visiting pilots are invited as guests of the club to the dinner and dance (8 p.m.), to be held at the Imperial Hotel, on Saturday, May 14. Accommodation on that night has been arranged at special reduced rates at all the leading hotels. On Whit Sunday, the day of the pageant, proceedings will open with a landing-arrival competition, for which a silver cup and a cash prize of £10 has been presented. The competition is open to all pilots arriving between 12.30 p.m. on Saturday and 12.30 p.m. on Sunday, May 15. A white tape 50 yds. in length will be placed on the aerodrome, and the aircraft which finishes its landing on arrival nearest to this tape will be adjudged the winner.

There will also be two open air races, the first a closed circuit of approximately 30 miles and the second from Skegness to Tollerton and back, a distance of about 100 miles. Both will be handicaps flown under the competition rules and regulations of the Royal Aero Club and F.A.I. Lunch and tea will be provided for visiting pilots by the club. Further details and entry forms for these races can be obtained from the Hon. Sec., the Aerodrome, Skegness.

BRISTOL AND WESSEX AEROPLANE CLUB

The Air League Challenge Trophy Race, which is a handicap open to all types of aircraft flown by "A" or "B" licensed pilots, will be held at the summer flying meeting at the Bristol Airport on June 4. Those wishing to compete should write for details of the race and entry forms to the Manager Bristol Airport.



FOR SMOOTH LANDINGS: A "Moth" (Gipsy) belonging to Eastern Air Transport, Ltd., which is used at the Skegness Aero Club. This firm know the damage which pupils may cause an aircraft by heavy landings and they have therefore wisely obviated this as far as possible by fitting Goodyear Airwheels.

WING CONSTRUCTION

(Concluded from page 336.)

Mr. Schofield (who is test pilot to the General Aircraft Company) said that perhaps he could most usefully deal with those questions which dealt with the experimental flights. With the fabric slacked by dope remover, he had dived the machine at 178 m.p.h. uncorrected airspeed. Probably the corrected speed would not be far short of 200 m.p.h. He did not think the tierods taken out had been selected by a personal enemy, but they *were* selected by a representative of another firm!

Mr. Spencer (of the R.A.E.) said that they had carried out tests on a Junkers wing to determine what effect the corrugated wing covering had in stabilising the tubular spars inside it, and it was found that when the skin was removed, the spar booms supported a load not much more than one-half of that carried while the skin was in place.

Fabric covering got old, and then contributed little to the torsional stiffness of a wing.

Mr. Bramson said that several times that evening Mr. Stieger had been called bold and daring. He thought they all ought to know that any boldness that might be apparent was due to the extremely prudent manner in which Mr. Stieger had gone on step by step in developing his wing.

Mr. Stieger said that he would prefer to answer most of the questions in writing, but he replied to a few. He did not agree with Mr. Duncanson in adopting the German system of $3\frac{1}{2}$ deg. deflection maximum. Machines differed so much that the time was not ripe yet for laying down hard and fast rules. He pointed out that the single spar of the wing built for the Fokker weighed exactly the same as the front spar of the Fokker. The speed range over which the small machine was flown was approximately from 38 m.p.h. to 200 m.p.h.



IN THE AIR

IT looks as if the coming season is to be one devoted to record breaking. Few plans have yet been made public, but it is fairly certain that the rumours of the aircraft which the Detroit Aircraft Corp. propose to send over here are founded on firm fact. It is said that one of their first attempts will be to lower the Cape and Australian records and that for this purpose both an "Altaire" and a new open cockpit low-wing monoplane will be used.

Before these, however, the Ford Co. are apparently hoping to establish a Cape and back record on their three-Wasp-engined 5 AT.G-ABHF, which has been flying over here for some time, the extra fuel supply being obtained from two 126-gall. tanks in the fuselage, giving a capacity by which it is hoped to make 9-hr. flights. Anglo-African Airways will, we imagine, look to this flight to justify their plans for a service to the Cape via the West Coast route. Wednesday, April 20, is believed to be the starting date.

In September, however, Mr. Valereaux Isherwood, son of Sir Joseph Isherwood, is planning to uphold British prestige and counteract this American invasion by flying to the Cape in three days solo. He will probably use an aircraft similar to that which has been entered by Lt. Com. E. W. B. Leake, R.N., for the King's Cup and which will be flown by Capt. E. W. Percival—not to be confused with the Mr. Percival who is flying Ford on the above record attempt. Several of these aircraft are understood to be under construction at the B.A.C. works at Maidstone, and through careful cleaning up their estimated performance is very considerably more than their prototype the Hendy 302. Inverted engines should account for some extra speed, as should redesigned undercarriages and decreased wing area. Mr. Isherwood will probably use an improved "Hermes IIB," while Lt. Com. Leake's machine may have the improved "Hermes" or "Gipsy III," according to which engine is ready for the race. The latter, it is rumoured, is to be installed in at least one of

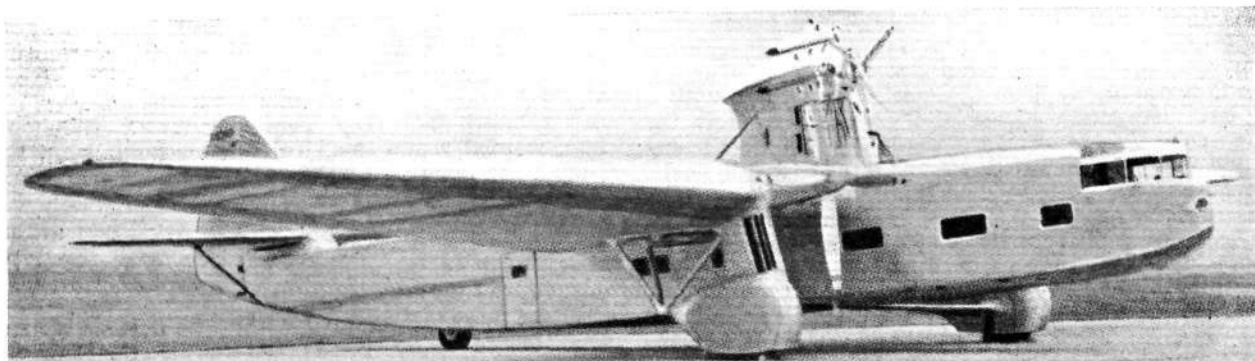
the "Fox" or "Puss Moths" in the King's Cup, so that race may be a try-out for the latest engines of both our premier air-cooled in-line light aircraft engine makers.

Yet another forthcoming record attempt is announced and—

MR. OSCAR GARDEN, known in South Africa as "the sundowner of the skies," from his habit of dropping in on his friends, from enormous distances, is preparing to break the record for the flight from South Africa to England on a "Spartan" aeroplane fitted with a Cirrus Hermes Mark II engine. He will travel via Cape Town, Cairo, along the northern coastline to Tunis, and thence to Marseilles, Lyons, Paris and Croydon. A specially-built racing propeller is being sent out to him from England, and he is depending on the Vacuum Oil Company for his supplies of Pegasus aviation spirit and Mobiloil.

Another Atlantic Flight is also planned and—

COL. J. C. FITZMAURICE, a member of the crew of the Junkers monoplane, *Bremen*, on its Transatlantic flight in 1928, has obtained a machine in which he intends to fly from New York to Dublin, or possibly Croydon, with Bernt Balschen, who flew across the Atlantic with Rear-Admiral Byrd in 1927, during this summer, according to a letter from Col. Fitzmaurice to a friend in Ireland. He adds that he has communicated with the Free State Minister in Washington regarding the possibilities of the issue of a special air-mail stamp for the flight; from inquiries made in Dublin, however, it is understood that the Irish Government are unlikely to issue such a stamp. This flight will apparently cause the abandonment of the joint flight of Col. Fitzmaurice and Capt. J. P. Saul, navigator of the *Southern Cross* on the Portmarnock-New York flight in 1930, which was arranged during the latter's visit to America last year. Capt. Saul is at present waiting for the return of Mr. J. A. Mollison in order to complete details of their proposed New York and back flight which was tentatively planned to start next month.



A NEW FORD TYPE : The 14-A is of unusual design and equipped for carrying passengers by night as well as by day. The central engine is a Hispano-Suiza rated at 1,100 h.p., while the wing engines, of the same make, are of 715 h.p. each. The wing engines are housed in the wing, while the central engine is placed in a streamline tower above the wing. The wing span is 110 ft. and the area 1,600 sq. ft. It carries 38 passengers at an estimated cruising speed of 150 m.p.h.

DEATH OF EUSTACE SHORT

IT is with the very deepest regret that we have to place on record this week the death of Mr. Albert Eustace Short at the age of 55. Mr. Short had taken the little "Mussel" seaplane up for his daily flight on April 8, and when he alighted on the Medway after his flight, those on the slipway at Shorts' Works at Rochester noticed with surprise that he did not begin to taxi towards home, but kept his engine running, the machine taxiing into the river bank, where it remained with the engine still running. When the boatmen who went out to tow him in reached the machine, they found Mr. Short apparently dead in the cockpit. He was taken to the sick bay at the works, where doctors administered oxygen, but without avail. It was subsequently ascertained that death was due to a clot of blood on the heart.

Eustace Short was the second of the three famous brothers, Horace being the eldest and Oswald the youngest, now the only surviving brother. To him and to Mrs. Eustace Short and her two daughters the deep sympathy of everyone connected with British aviation will be extended. There is some consolation to be derived from the fact that Eustace Short died as he probably would have wished, "at the wheel." A few years ago he decided that it was his duty as one of the heads of the famous firm to learn to fly, and under the instruction of Mr. Lankester Parker, Shorts' test pilot, he set to work with determination. There were those who thought it unwise for a man over 50 years of age to take up flying, but Eustace Short was never a man to be lightly turned away from any matter about which he had made up his mind. This, incidentally, has been a characteristic of all three brothers, and accounts to a

large extent for the success of the firm. Obstacles have arisen from time to time in the history of Short Brothers, particularly during the earlier period, but Horace, Eustace and Oswald would never acknowledge defeat. Thus, when Eustace decided that he would learn to fly, he *learnt* to fly. And although he took, perhaps, a little longer over it than a youngster might have done, he graduated into a very good pilot.

We imagine that when he decided to fly, Eustace Short did so largely from a sense of duty. But before long piloting became a pleasure, and he was never happier than when he was out over the mouth of the Medway or the Thames Estuary in the little "Mussel," sometimes with a friend, but more often alone. To watch from aloft the shipping in the Estuary, and the shadows of clouds chasing across the face of the water and over the Kentish fields, became one of his greatest delights. Nor did he confine himself to flights in the "Mussel." Whenever Lankester Parker took up a Short machine for tests, Eustace Short was more often than not to be found in the seat by his side, his hands and feet on the second set of controls provided. And one may be quite certain that if the end had to come now, Eustace Short would have wished it to come as it did, quickly, painlessly, and almost while he was engaged in his beloved pastime. And, after all, no man can ask for much more than that.

It is now such old history that it may come as a surprise to many of our readers that the brothers Short began their aeronautical career as balloonists. As early as 1897 Eustace Short made balloon ascents, and he remained for

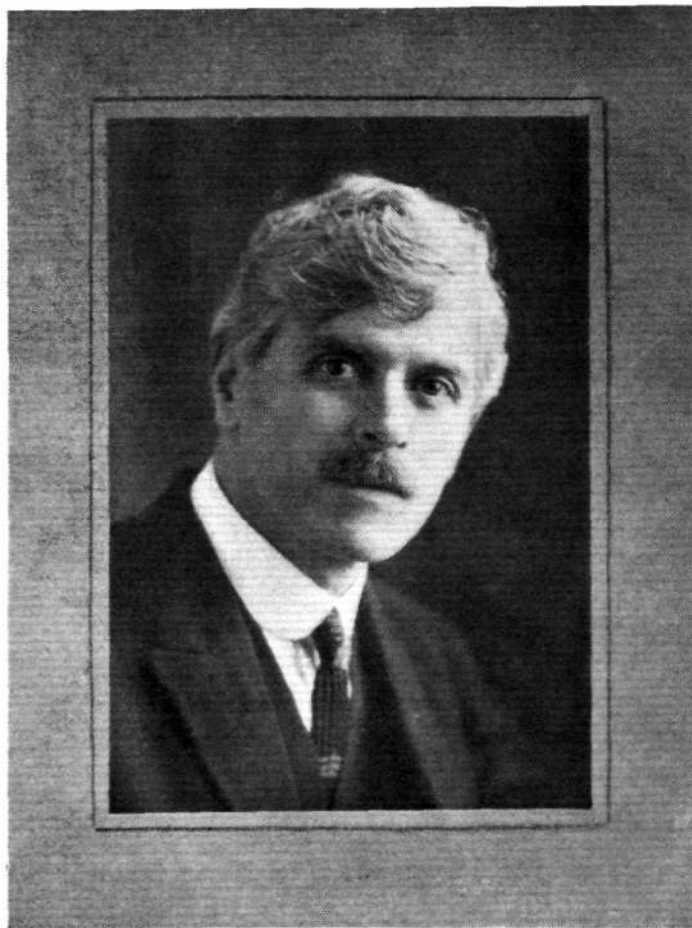
many years an enthusiastic balloonist, first as an amateur and later, when the brothers began balloon construction at Battersea, as part of his business. Not only at home, but also abroad, did Eustace Short make balloon ascents, and sometimes, if one happened to find him in the right mood (he was usually reticent to the point of shyness), he would talk of his early balloon experiences. One trip he made to a South American country to teach army officers the art. By making full use of the air currents in the valleys he was repeatedly able to make an out-and-home journey, landing close to his starting place. Sometimes the balloon would be blown to within a few feet of the mountainside,

but always in the nick of time a current of air would sweep it out over the valley again. His time as an instructor was cut short, however, because he found that his pupils were wont to fortify themselves with "Dutch courage." This did not tally with Eustace Short's idea of the fitness of things, so he packed up his balloon and came home.

When the Wright Brothers in America and Farman, Voisin and Blériot in France began to make flights in heavier-than-air craft, the brothers Short, with that foresight and imagination which ever characterised them, at once realised the enormous possibilities of this new form of aviation. It was not long before works were established, first at Leysdown and later at Eastchurch, Isle of Sheppey, from which were destined to emerge some of the finest aircraft of the time. The eldest brother, Horace, was the moving spirit in those days, and his technical ability was of a very high order. Eustace did not take quite as active a part in the details of the business, but he brought to bear his very practical and common-sense outlook on life and things.

During the war the new works which had been established on the banks of the Medway just above Rochester Bridge grew to large proportions. When Horace Short died (during the war), it was Oswald to whom fell the task of managing the concern, and Eustace continued to be a partner. In a somewhat curious way, Eustace Short was, during the last few years, able to bring his balloon experience to bear upon quite a different subject. Mooring buoys for the Short seaplanes and flying-boats on the Medway were a nuisance. If one was rammed during the process of picking it up it was likely to damage the aircraft. And the metal buoys were heavy and clumsy. Eustace looked at these buoys day after day from the slipway, and one day decided that they were ridiculous. What was, in fact, wanted was a small balloon for holding up the loose end of the mooring tackle. He had some made, and they worked. He got out an improved type which was even better, and in which the "balloon net" had disappeared. Details of the mooring gear were worked out in rustless steels, and at the time of his death Eustace Short was well on the way to pioneering yet another invention—the resilient buoy. It is quite within the bounds of possibility that before many years Eustace Short's buoys will be found in the harbours and estuaries around our coasts. And by a curious trick of fate, Eustace Short very nearly came back to ballooning again before he died. He and his brother Oswald had great plans for building a balloon which should go higher into the atmosphere than any balloon has ever achieved.

The funeral took place at Hampstead on April 13.



The late Mr. Eustace Short

Wing Construction

THE paper under above title, read by Mr. H. J. Stieger, D.I.C., A.F.R.Ae.S., before the Royal Aeronautical Society on April 7, was one of very great interest, although some would possibly have preferred it to be of a slightly more technical character. However, as it was, the paper and its arguments could be followed by anyone with quite a slight knowledge of aircraft engineering, and thus its appeal should be all the wider.

In introducing the lecturer, Mr. C. R. Fairey, who was in the chair, recalled that Mr. Stieger was particularly qualified to lecture to the Royal Aeronautical Society on the subject of wing construction, of which he had unrivalled experience. Mr. Fairey pointed out that after training and study in Switzerland and at the Imperial College, South Kensington, Mr. Stieger joined Wm. Beardmore, who built the first Stieger wing. He was now managing director of the Monospar and General Aircraft Companies.

The paper was a very long one, and Mr. Stieger read only portions of it. In the following summary we have used our own discretion in selecting extracts, sometimes quoting from Mr. Stieger's actual words and sometimes

aerodrome; the fuselage was for passenger accommodation, the existing wing capacity not being used, and for supporting the tail, whose function was to overcome and control an inefficient wing design.

The next section of Mr. Stieger's paper dealt with the aerodynamic layout for cantilever wings, and referred to plan form, wing depth, and wing thickness taper. The best all-round proportions were, for a given aspect ratio, a taper in which the tip chord was from 25 per cent. to 30 per cent. of the root chord. The correct aspect ratio varied. A usual value was from 7 to 7.5. Wing thickness should not be much more than 20 per cent. of the chord at the root, and 10 per cent. at the tip.

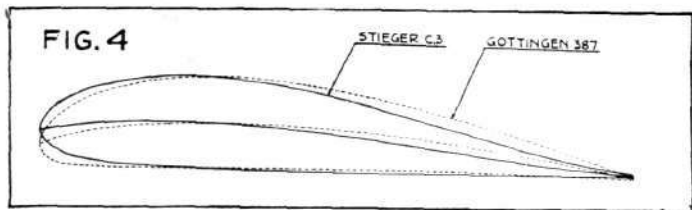
Concerning wing sections, Mr. Stieger said that it was a basic principle in aerodynamics to avoid any sudden changes of airflow. A large trailing edge angle contradicted this, and caused the air stream to break away. The Stieger C.3 section shown in Fig. 4 represented an attempt to overcome some of the disabilities which thick aerofoils experienced. The object was to obtain the best possible compromise between high maximum lift, low minimum drag, and reasonably small moment coefficient at zero lift. The C.3 was designed for single spar construction, and as it gave good all-round results it rather looked as if the necessity for providing good depth for a rear spar had hitherto had an unfavourable influence on aerofoil development.

Mr. Stieger advocated wing sections with small centre of pressure travel and low drag; in other words, aerofoils with the medium line slightly reflexed at the trailing edge. Too great a reflex curvature caused roughness of aileron operation. In Fig. 9 are shown a reflexed and a normal section, and the lecturer pointed out that with the reflex section at small incidences the air pressure on the aileron was in a downward direction, causing the control to become heavy at high speeds, as well as introducing slackness in the cables.

The question of aileron proportions was a compromise. Generally speaking, the torsion due to aileron operation ought to be less than the maximum torsion for the particular wing in the terminal dive case. One way of getting around the difficulty to some extent was by using a triangular wing tip construction, as shown in Fig. 8. The deflection increased to a certain point, and then fell off again towards the tip. The result was that the maximum allowable twist for a wing of this type could be very much greater than for the standard type without loss of control.

Wing Root Interference

The problem of wing root interference was always important, but particularly so in a low-wing cantilever monoplane. With a thick wing root the flow was very bad at large angles and might give rise to tail "buffeting." By attaching small streamers on a small low-wing twin-engined monoplane, they had been able to observe the flow, which was particularly bad. They had been able to make an improvement by fitting auxiliary aerofoils above the leading edge, but obviously the logical thing to do was to prevent the stalled type of flow from starting at all. A satisfactory solution was found by reducing the wing thickness at the root, and by giving the incidence a wash-out at the root. This meant a small sacrifice in maximum lift, but was considered well worth while. (See Fig. 10.)



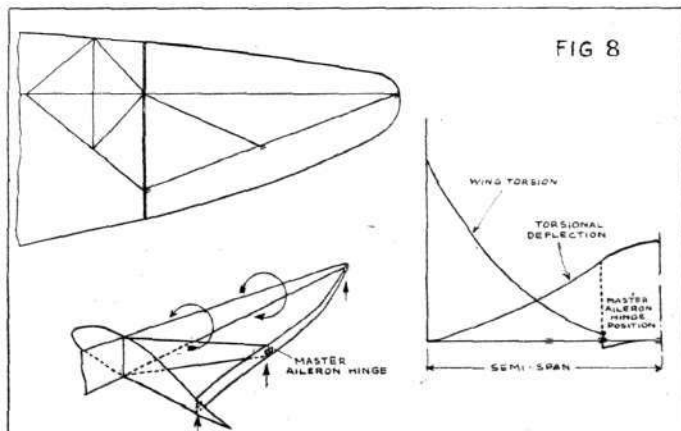
Comparative Aerofoil Sections.

from the printed paper. Lack of space prevents us from publishing all the illustrations used by Mr. Stieger, but we have omitted only such as appeared to us to deal with already well-known and familiar subjects. We have not reproduced all the illustrations, but have retained the original numbering.

Weight, Mr. Stieger said, was the key to everything that mattered in aircraft construction. Analysing the weight figures for an aircraft, one could classify them into three groups:—(1) Weights over which the designer had no influence (engines, accessories, airscrews, instruments, etc.); (2) weights over which the designer had a limited influence (fuel tanks, pipes, cowlings, controls, cabin equipment, windows, heating, etc.); (3) weights within the designer's influence (wings, fuselage, tail unit, undercarriage, controls, etc.). Expressed as percentages of the tare weight of the machine, these three groups accounted for the following:—(1) 35 per cent.; (2) 20 per cent.; (3) 45 per cent. Relating these figures to the all-up weight and assuming a total tare weight of 60 per cent. of the gross weight, the groups represented the following percentages of the gross weight:—Group 1, 21 per cent.; group 2, 12 per cent.; and group 3, 27 per cent. The 27 per cent. for group 3 could be split into 15 per cent. for the wing structure and 12 per cent. for the remainder. The wing weight item represented only about 15 per cent. of the total weight, but about 50 per cent. of the weight items directly under the designer's influence. He would deal only with that form of weight saving based on careful layout in view of the aerodynamic loads and the efficient structure to take these loads.

The structural system chosen depended upon the size and type of aircraft. He would base his discussion on a group of commercial aircraft ranging from 8,000 lb. to 20,000 lb. all-up weight. The first question to be decided was monoplane or biplane. In January, 1929, Mr. W. S. Farren read a paper before them on that subject, which resulted in a complete victory for the biplane. In view of the developments during the last few years, he felt that Mr. Farren's verdict ought to be reconsidered.

The fundamental elements of an aeroplane were the wings, which enabled it to fly by producing lift, and the engine which enabled the machine to climb into the air and keep up the necessary speed. The rest expressed our inability to construct an efficient aeroplane. The undercarriage was necessary for a long run on a nice expensive



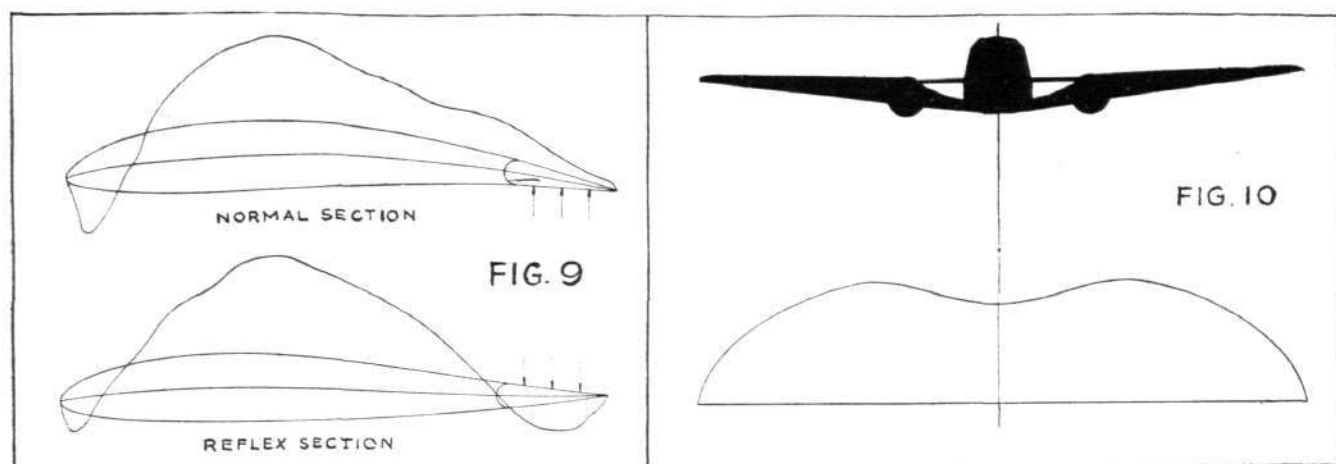


Fig. 9 shows pressure distribution at small angles of incidence, and Fig. 10 loading distribution in the centre of pressure forward case.

Some Characteristic Structures

In reviewing some characteristic wing structures, the lecturer said that some of these represented many years' work and engineering experience, and that he was far from desiring to condemn or praise off-handedly any particular type.

In Fig. 11 Mr. Stieger showed seven types using rigid covering to make the wing stiffer.

No. 1 of Fig. 11 shows the B.F.W. wing. It had a single spar, and the stiff nose covering was designed to form, with the spar, a closed box to resist drag and torsion loads. The spar was situated in the most efficient position at the maximum ordinate. Mr. Stieger said he understood that at first this type of construction gave a certain amount of trouble by the skin crinkling, and that it was found necessary to stabilise the nose with a large number of ribs. Towards the root a second spar had to be added, the box being increased in size as shown by the dotted lines.

No. 2 showed the Lepere-Weymann wing. This was of Duralumin construction, with single spar and the skin stabilised by longitudinal stringers. The amount of material to stabilise the skin was greater, and the shallow rear portion was not efficient in torsion.

No. 3 showed Rohrbach construction. The material was Duralumin, and the two spars were connected by top and bottom panels to form a rectangular box. The main loss of weight occurred in stabilising the skin. In more recent Rohrbach designs the rectangular box had been replaced by one almost square in section in order to reduce the skin area.

No. 4 was the well-known Fokker wing of wood construction. This the lecturer regarded as one of the most successful wings, just because the wooden covering was thicker than a metal skin and thus more stable in itself and needing little stiffening.

Nos. 5, 6 and 7 showed Ford, Junkers and Bristol experimental wings respectively. The Ford had three spars of ordinary Warren girder type. The Junkers used the characteristic pyramid shear bracing, with a number of tubular spars. The Bristol was similar to the Ford except for the increased number of spars. On two spars, the lecturer said, the load distribution was difficult to calculate. On the multi-spar wings it was almost impossible to calculate, because the spars were connected not only by the skin but by a system of shear bracing. Mr. Stieger next turned his attention to fabric-covered wings in which the structure is made torsionally stiff in itself. This type of wing, he said, had come to the front during the last few years only.

In Fig. 12 Mr. Stieger showed four types of fabric-covered wing, or rather three and a variation of one of them. No. 1 shows a wing with a single tubular spar of large diameter. No. 2 is a variation of this, with an I spar added to the tube. (Mr. Stieger did not say so, but this is the type of spar used by Mr. Duncanson in an article of Cantilever Wings published in THE AIRCRAFT ENGINEER some years ago.—Ed.) Mr. Stieger's comments on these two spars were that No. 1 wanted numerous diaphragms because of the thin walls, and was inefficient in bending, while No. 2 was better in bending, but if the tubular part was made just strong enough to take the torsion, the torsional deflection would be too great.

No. 3 shows the Wallis spar. This was a square box with either bracing wires or shear struts. If wires were used, the top panel would get slack under bending loads, and therefore inefficient for torsion.

No. 4 shows the Henderson spar (as used in the "Hobo," 302, and Hinkler "Ibis."—Ed.). Mr. Stieger's contention was that this type of spar was not efficient. If torsion was applied half way along the span, then the deflection of the outside portion was greater than at the point of load application, and torsional deflection was great.

Of the wings in Fig. 13, the Fairey monoplane wing is shown in No. 5. This had two spars, a system of compression pyramid struts, with wire bracing in the bottom panel. As the system was unsymmetrical a plain drag produced torsional deflection, and pure torsion produced drag.

The wing No. 6 had two spars with tension pyramids. It was similar to No. 5, but the system was symmetrical.

No. 7 was a single spar, with compression pyramids forward of the spar, and with apices on the leading edge.

No. 8 was a Boulton & Paul two-spar wing, with strut pyramids on rear side of front spar.

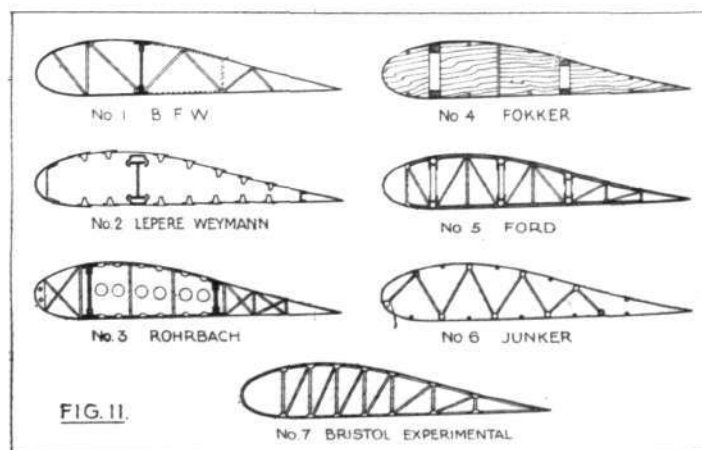
Multi-spar v. Single Spar

Structural efficiency depended upon the length of path of the transmission of the load, on the load in the member, and on the stress developed.

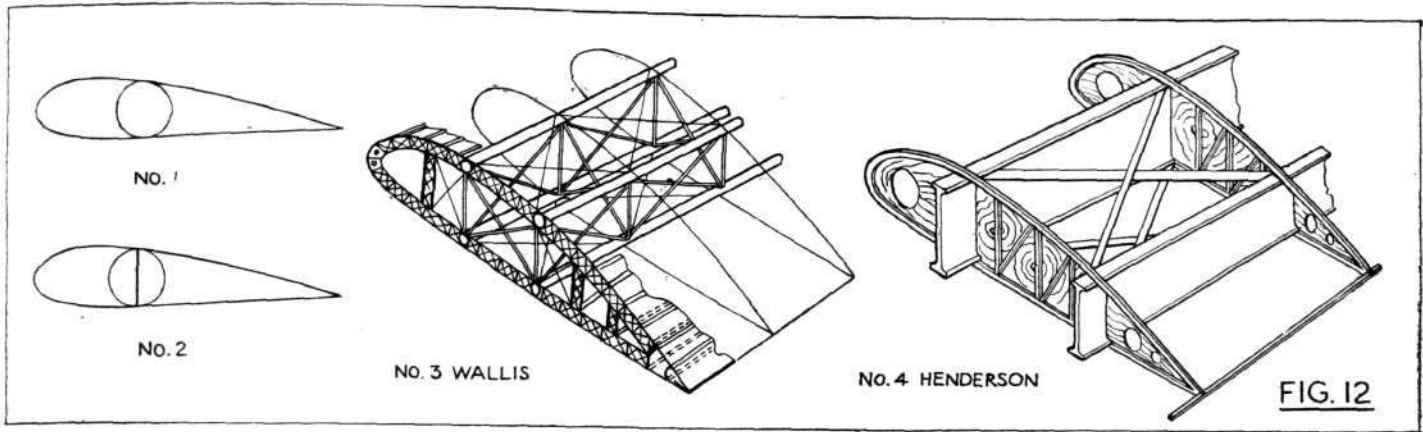
Theoretically the multi-spar wing should be the lightest, as the loads were taken to the fuselage by the shortest path. In comparing the single spar and the two-spar wing, Mr. Stieger found that the spar weight of the two-spar wing was about 40 per cent. greater than that of the single spar wing.

For carrying compression loads, the moment of inertia and the degree of stability were of primary importance. In the multi-spar wing the moment of inertia of the individual booms was small, and the spars had to be stabilised at short intervals. This necessitated an elaborate system of cross bracing.

Turning to the subject of strength calculation, Mr. Stieger said we had prided ourselves on our accurate methods and on our strain-energy theories. Sometimes this



Types of wing construction with rigid covering.



Types of wing construction with fabric covering.

led to a sense of false security. In the case of a multi-spar wing (Fig. 14), if it was assumed that the load was applied proportionately to each spar, and each spar was made as efficient as possible, then, since deflection was proportional to spar depth as well as to the proportion of load supported, the wing section would tend to distort. Inter-spar bracing was used to maintain the wing section, but this restrained the more shallow spars from taking their share, and the deeper spars would take a larger proportion and develop a higher stress.

Rib Design

Theoretically the ribs of a monospar wing should be heavier than the ribs of a multi-spar wing. However, a concrete example showed that the rib of a single spar wing was within 2 per cent. of that of a two-spar rib designed to carry about the same load, and of the same chord.

In very large and deep wing sections, the shear bracing of the ribs became very inefficient, and it then paid to go to a stringer system of the type shown in Fig. 16. Mr. Stieger thought that the size at which the stringer system showed to advantage was from 800 sq. ft. and upwards.

Wing Covering

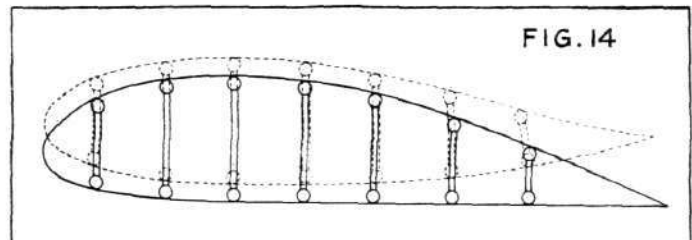
Mr. Stieger was an advocate of the fabric covering of wings. He thought if this was good enough for the fastest fighters it was good enough for commercial machines. The difference in weight between fabric and metal covering represented 11 per cent. of the pay load.

Summing up the controversy between multi-spar and single spar wing construction, Mr. Stieger said he was convinced that the single spar won. It was some 30-40 per cent. lighter, definitely much cheaper, and lent itself to sufficiently accurate strength calculation.

The Monospar System (Fig. 17)

When, a few years ago, trouble arose with wing flutter and loss of aileron control, the only remedy appeared to

be multiple spars, and when a wing of the single spar type was ordered by the Air Ministry nobody seemed to take it seriously. Yet the single spar wing had now proved itself. The system consisted essentially of a single spar placed at 0.3 of the chord, and two tension helixes forming a system of pyramid bracing. The apices of the pyramids were kept apart by compression members parallel to the chord. Drag and anti-drag loads were taken by this pyramid bracing in conjunction with tension members parallel with the span. Once the pyramid bracing was correctly installed it needed no subsequent attention. If a tension member were to break, the torsion was released on to the spar over that particular pyramid, and this had to be taken by the resistance of the spar booms to lateral bending. A monospar machine had been flown with alternative tension members removed, and all normal manoeuvres carried out.

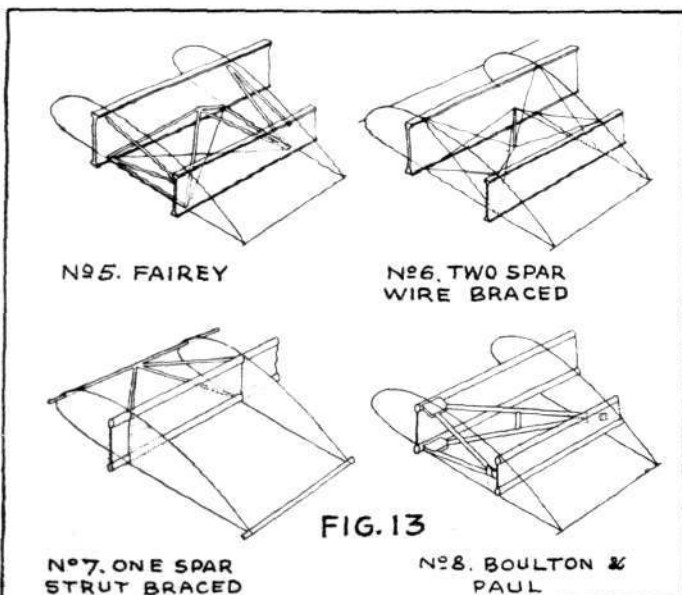


DISTORTION OF MULTI-SPAR WING UNDER LOAD : It is assumed that equal maximum stress is developed in each spar, and deflection is therefore proportional to the spar depth.

All monospar wings so far constructed had been designed for just the necessary torsional strength, and it had been found that this gave sufficient rigidity to avoid flutter and aileron reversal. The fabric contributed something to torsional thickness, how much depended on the wing design and on the condition of the fabric. A monospar machine had had its wing fabric slackened off with dope remover, and in several dives at terminal velocity no flutter or loss of aileron control were apparent. A single spar fabric-covered wing could be much more flexible without risk of flutter than a multi-spar wing with rigid covering. A flexible wing helped to absorb dangerous bumps.

In a table of weights of items in the monospar wing built for the Fokker F.VII 3-m. (gross weight 8,000 lb., wing area 630 sq. ft.), the total primary structure was 53.08 per cent. of the net wing weight. The secondary structure was 35.90 per cent., and ailerons were 7.18 per cent., while aileron controls in wing, electrical equipment, wireless mast, pitot tube, etc., accounted for 3.84 per cent. The wing weight was 9.75 per cent. of the all-up weight of the machine, and just under 1½ lb. per sq. ft.

It was difficult to compare wing weights on a fair basis. A general figure for machines from 8,000 lb. to 20,000 lb. all-up weight was 15-18 per cent. of the all-up weight. In the monospar this was reduced to 10 per cent., i.e., a weight saving of 6 per cent. The pay load would probably be about 20 per cent. of the all-up weight, with a range duration of 4-5 hr. The wing weight saving of 6 per cent. for the monospar wing meant an increase in pay load to 26 instead of 20 per cent. In other words, the machine could be 23 per cent. smaller, with engines of lower power,

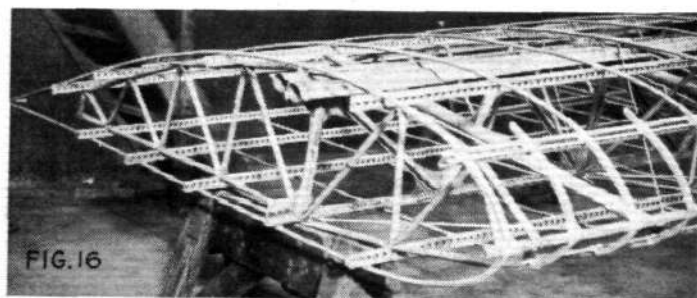


Further fabric-covered types of wing.

costing less in the first place and having lower running costs. Or alternatively, the range could be increased by about 40 per cent.

An increase of 30 per cent. in pay load should enable civil aviation to free itself from the unnatural state of partial dependence on a subsidy.

In conclusion, Mr. Stieger said that he knew, none better, that the limit in weight reduction had not been reached, and he predicted a wing weight of $7\frac{1}{2}$ per cent. of the all-up weight of the aircraft. He did not expect anyone to believe him, but he was not worrying. He was not yet trying to convince anybody.



A Stringer Type of Monospar Wing: Mr. Stieger recommended this type of construction when the wing area exceeded 800 sq. ft.

The Discussion

When Mr. Stieger had read his paper the Chairman called upon Mr. McKinnon Wood to open the discussion.

Mr. McKinnon Wood said he spoke with a great deal of diffidence, as he had never had the opportunity to make a specialised study of the very complex subject of aircraft structures. In the main he agreed with the lecturer on his remarks about fabric covering, the multi-spar wing, and the need for stiffness. In his view it was not a question of choosing between monospar and multispar, but between the monospar and the two-spar wing. In his lecture some time ago Mr. Farren had shown how torsional stiffness helped to distribute the load between the two spars. Mr. McKinnon Wood sketched two wing sections on the blackboard, one having a rectangular formation single-girder spar located in the region of the centre of pressure, and the other being the Stieger system. Mr. McKinnon Wood said that to him it seemed that the most economical wing of the two would be that in which the spar end elevation included the larger area. Concerning Mr. Stieger's remarks about the trailing edge angle he was a little uncertain what was meant, but assumed that the lecturer was referring to the angle included between upper and lower surface at the trailing edge of the section. He would like to know upon what information the lecturer based his statement that this angle was important in influencing the stalling characteristics. He personally was under the impression that this angle did not affect the stalling to any very large extent within fairly wide limits.

Mr. F. Duncanson (of the Gloster Aircraft Co.) considered Mr. Stieger's monospar wing the most important invention in recent years, and recalled that when Mr. Stieger first endeavoured to introduce it he met a great deal of opposition. He was to be congratulated not only on now having proved his case but also on having been able to secure the necessary support elsewhere than in the aircraft industry. The vexed question, monoplane or biplane, no longer existed, he thought, and the only exception to that was the biplane for certain military types in which, for other than structural reasons, the biplane arrangement was preferred. He confessed that when the monospar wing was being built for the Fokker F.VII 3-m he was a little doubtful of the adequacy of the torsional strength, but flight tests had proved this to be quite satisfactory. He thought the strength requirements at present in force in this country might not be quite logical, and was inclined to favour the German system of demanding a deflection of not more than $3\frac{1}{2}$ degrees under terminal nose dive conditions.

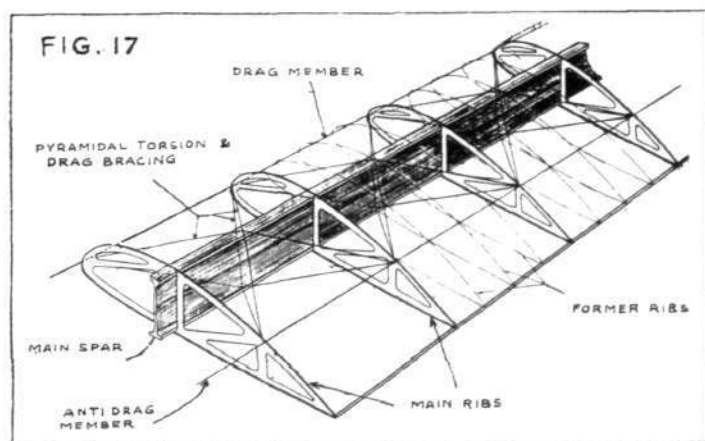
Concerning the slide shown of a single-spar section in which the spar consisted of an I-section beam for taking bending loads and a surrounding circular-section tube to take torsional loads, there were, Mr. Duncanson said, very good scientific reasons why such a spar arrangement was

efficient. (A wing of this construction was used by Mr. Duncanson in an article on cantilever wings, published in THE AIRCRAFT ENGINEER Monthly Technical Supplement to FLIGHT on June 27, 1929.—ED.)

Mr. Hollis Williams (of the Fairey Aviation Company) said that the lecturer had put him in a slightly awkward position by mentioning the low weight of the monospar cantilever wing, since the head of the company with which he was associated was in the chair that evening and might well be wondering why *his* (Mr. Fairey's) monoplane wings did not weigh as little. Mr. Stieger appeared to have shot all their preconceived notions to pieces, but on comparing the lecturer's figures with those for a number of Fairey machines he had come to the conclusion that the secondary structure ran away with a great deal of unexpected weight. The company had had large numbers of machines in service for many years in many different localities, and the question of making aircraft robust enough to stand handling always had to be kept in mind. He thought he might put the case by saying that his firm had a millstone of experience around its neck. Average figures for Fairey machines showed that their biplane wings weighed a little under 1 lb. per sq. ft., while the monoplane wing weight was a little over 1 lb. Taking it all around, he thought one might say that the monospar wing would save something like $\frac{1}{2}$ lb. per sq. ft. He also pointed out that in a military machine liable to be shot at, there was something to be said for redundancy of structural members.

Dr. Lachmann (of Handley Page, Ltd.) came to the defence of his compatriot, Mr. Messerschmitt (whose B.F.W. wing construction was somewhat criticised by Mr. Stieger), by pointing out that the B.F.W. tests referred to were carried out to establish experimental proof of a formula which had been evolved for calculating torsional stiffness of a single spar with metal skin over the nose of the wing. The wing actually weighed approximately the same as the Stieger wing, and the nose covering gave the advantage of greater redundancy.

Mr. H. J. Pollard (who has been mainly responsible for the Bristol multispar wing) challenged the lecturer on the subject of deflection, claiming that the slide shown gave a grossly exaggerated impression. He did not agree with Mr. Stieger that the stress should be the same in all the spars. It should be uniform over the whole length of each spar, but might differ from spar to spar. One advantage the multispar wing with metal covering had was that there was no rigging to be done, while the covering could be in stainless steel and make the wing impervious to the weather.



General Arrangement of Stieger Monospar system of wing construction.

Mr. Mettam (of Westland Aircraft Works) claimed that his firm had proved that one could make a strut or wire braced monoplane as free from flutter as a biplane, while the wings weighed no more. He thought it was obvious from the paper (Mr. Stieger having said that the function of the tail was to overcome and control an inefficient wing) that what the lecturer wanted was a "Pterodactyl." The converse was not necessarily true. He agreed that wash-out gave but little loss of lift. He would like to know if the task of selecting the torsion bracing wire to be removed was left to someone with a personal grudge against the test pilot! He also would like to know at what speed the machine was dived.

(Concluded on page 331.)

THE ROYAL AIR FORCE

London Gazette, April 5, 1932.

General Duties Branch

Lt.-Com. R. H. S. Rodger, R.N., is reattached to R.A.F. as Flying Officer, with effect from March 21, and with seny. of April 27, 1925. The following Pilot Officers are promoted to rank of Flying Officer:—(Feb. 12), R. Hanson, J. W. Martin; (March 12), F. Crump, G. E. B. Nixon, P. J. Polglase, J. A. Tester; (March 22), A. Hugh Button (with seny. of November 19, 1931). The following are promoted with effect from April 1.—*Flying Officers to be Flight Lieutenants*.—E. L. J. Rowe, L. G. Martin, D. J. T. Haynes, W. C. Cooper, J. R. Mutch, C. W. Dicken, W. N. Blain, G. Francis, J. Marson, T. J. Arbuthnot, R. F. Gandy, B. H. Ashton, J. D. F. Bruce, R. J. P. Morris. Wing Com. R. M. Field is restored to full pay from half-pay; March 12. Wing Com. C. H. Elliott-Smith, A.F.C., is placed on half-pay list, Scale A, from April 9 to April 14 inclusive. Flying Officer P. J. Stapleton is placed on retired list on account of ill-health; April 1. Flight Lieut. J. Duncan is placed on retired list on account of ill-health; April 2. Flight Lieut. E. Brewerton, D.F.C., is placed on retired list at his own request; April 4. Lt. (now Lt.-Cdr.) C. N. Lentaigne, R.N., Flying Officer, R.A.F., relinquishes his temp. commn. on return to Naval duty; April 4, 1930. (Substituted for Gazette, April 22, 1930); Pilot Officer on probation A. H. J. de P. Smith relinquishes his short service commn. on account of ill-health; March 31.

Stores Branch

The following are promoted with effect from April 1.—*Flying Officers to be Flight Lieutenants*.—R. M. Taylor, M.C., J. F. Young, M.M., C. B. Horsfield, C. Hanson-Abbott, A. G. Stratford-Tuke, H. Seidenberg, W. F. Langdon. Sqdn. Ldr. F. Anderson is placed on retired list; March 31. Flight Lieut. J. Hobbs is placed on retired list; April 5.

Medical Branch

Flying Officer H. R. Clein, M.B., B.Ch., is promoted to rank of Flight Lieut.; March 31.

Memorandum

The permission granted to F. B. O'Dowd to retain the hon. rank of Lieutenant is withdrawn on his conviction by the Civil Power; February 9.

ROYAL AIR FORCE RESERVE RESERVE OF AIR FORCE OFFICERS

General Duties Branch

The following are granted commns. in Class AA (ii) as Pilot Officers on probation:—G. P. Harger (March 14). T. G. F. Mathers, M. R. C. Thomas,

M. F. Peacock (March 21). G. I. F. Thomson (March 22). B. T. Aikman (March 23). Flying Officer P. Du Cane is granted a commn. in this rank in Class A on resigning his commn. in Auxiliary Air Force (November 15, 1931).

The following Pilot Officers on probation are confirmed in rank:—(March 16)—K. S. Alderton, A. D. Baxter, D. Beevers, W. W. Briscoe, R. E. G. Brittain, J. R. M. Brunton, C. F. A. Cockburn, J. K. Day, T. G. Figgis, J. G. Giddins, S. F. Godden, A. L. G. Hatrick, F. H. Hawes, N. M. Hone, W. F. Jennings, N. N. McKinnon, D. M. Robertson, H. F. Ruston, E. W. Spilman, F. O. Thornton, V. B. Twiss, P. E. Underwood, E. P. Young. (March 17)—D. N. Grice, P. T. Petley, J. E. Robins, J. A. Rogers. (March 18)—J. F. Truscott. (March 19)—The Hon. J. Grimston, J. G. Macintyre.

Pilot Officer on probation S. W. Fitt is transferred from Class AA (ii) to Class C (September 23, 1931). The following Flying Officers relinquish their commns. on completion of service:—G. D. Ashby (March 30). R. McLaughlin, D.F.C. (April 6). Flight Lieut. A. L. Russell relinquishes his commn. on completion of service and is permitted to retain his rank (August 23, 1931).

Stores Branch

Flight Lieut. A. E. M. Dredge, M.B.E., relinquishes his commn. on completion of service (January 26).

Medical Branch

Flight Lieut. J. J. Quinlan, M.B., B.Ch., relinquishes his commn. on appointment to a commn. in Indian Medical Service (February 2).

SPECIAL RESERVE

General Duties Branch

G. R. H. Black is granted a commn. as Pilot Officer on probation (March 16).

AUXILIARY AIR FORCE

General Duties Branch

No. 601 (COUNTY OF LONDON) (BOMBER) SQUADRON.—Flying Officer N. H. Jones relinquishes his commn. on completion of service (October 25, 1931). Flying Officer P. Du Cane resigns his commn. on appointment to commn. in Reserve of Air Force Officers (November 15, 1931).

No. 605 (COUNTY OF WARWICK) (BOMBER) SQUADRON.—Flight Lieut. J. M. Leach relinquishes his commn. on completion of service and is permitted to retain his rank (November 2, 1931).

No. 608 (NORTH RIDING) (BOMBER) SQUADRON.—Pilot Officer G. Shaw is promoted to rank of Flying Officer (February 29).

ROYAL AIR FORCE INTELLIGENCE

Appointments.—The following appointments in the Royal Air Force are notified:—

General Duties Branch

Group Captain V. O. Rees, O.B.E., to Home Aircraft Depot, Henlow, 1.4.32, to command, vice Group Capt. W. C. Hicks, A.F.C.

Squadron Leader C. E. H. C. Macpherson to H.Q., Coastal Area, Lee-on-Solent, 29.3.32, for personnel staff duties.

Flight-Lieutenants: E. J. Ffoulkes-Jones to No. 5 (A.C.) Sqdn., Quetta, India, 7.3.32. C. K. J. Coggle, to No. 43 (F) Sqdn., Tangmere, 30.3.32. S. H. C. Gray, to No. 28 (A.C.) Sqdn., Ambala, India, 1.3.32. C. H. Johnson, to Station H.Q., Andover, 21.3.32. A. F. Lingard, to No. 18 (B) Sqdn., Upper Heyford, 1.4.32. T. M. Abraham, to Station H.Q., Boscombe Down, 1.4.32.

Flying Officers: E. L. J. Rowe, L. T. G. Barber, A. E. Dobell, D. W. Morrish, and J. W. Bateman, to R.A.F. Base, Calshot, 3.4.32. N. F. V. Henkel, to No. 1 Armament Training Camp, Catfoss, 16.3.32. C. R. J. Hawkins, to No. 2 Armament Training Camp, North Coates Fitties, 20.3.32. R. M. Messiter, to No. 2 Armament Training Camp, North Coates Fitties, 20.3.32. A. C. Larmuth, to No. 1 Armament Training Camp, Catfoss, 12.3.32.

Pilot Officers: T. King, to No. 209 (F.B.) Sqdn., Mount Batten, 5.3.32. M. Hare, to No. 216 (B.T.) Sqdn., Heliopolis, Egypt, 16.3.32. R. A. Phillips, R. Cleland, N. B. Littlejohn, to R.A.F. Base, Calshot, 3.4.32. The undermentioned Pilot Officers are posted to No. 5 Flying Training School, Sealand, 29.3.32: H. R. Allen, W. J. Craig, N. D. Crockett, A. H. Fox, W. M. Keddie, A. W. Langton, G. E. Macdonald, W. McAulay, D. G. Ross, H. M. Russell, J. A. D. Sandeman, P. R. Simpson, W. L. Stedman, E. G. Thompson.

Stores Branch

Squadron Leaders: J. K. Macdonald, to Aeroplane and Armament Experimental Establt., Martlesham Heath, for Stores duties vice Sq. Ldr. F. R.

Wilkins, 29.3.32. T. Bell, M.M., to No. 3 Stores Depot, Milton, 1.4.32, for stores duties.

Flying Officer J. R. Fraser, to Aeroplane and Armament Experimental Establt., Martlesham Heath, 29.3.32.

Accountants Branch

Squadron Leader W. R. Westcombe, to No. 3 Flying Training School, Grantham, 29.3.32, for Accountant duties.

Flight Lieutenant R. G. Dyer, to Home Aircraft Depot, Henlow, 1.4.32.

Medical Branch

Squadron Leaders: W. G. L. Wambeck, to Station H.Q., Manston, 31.3.32, for duty as Med. Officer. T. C. St. C. Morton, to R.A.F. Hospital, Cranwell, 2.4.32, for duty as Med. Officer, vice Sq. Ldr. J. K. R. Landells. P. C. Livingston, to Station H.Q., North Weald, 2.4.32, for duty as Med. Officer.

Flight Lieutenants: E. E. Isaac, M.C. (Hon. Sq. Ldr.), to H.Q., Inland Area, Stanmore, 1.4.32. J. Parry-Evans, to R.A.F. Depot, Uxbridge, 1.4.32. I. J. Corcoran, to Palestine Gen. Hospital, 14.3.32. C. Crowley, to Station H.Q., Heliopolis, Egypt, 2.3.32. C. J. S. O'Malley, to H.Q., Middle East, Cairo, 4.3.32. G. H. J. Williams, to No. 47 (B) Sqdn., Khartoum, Egypt, 2.3.32.

NAVAL APPOINTMENTS

The following appointments have been made by the Admiralty:—

LIEUT.-COMDRS.—R. R. Graham (Flt. Lieut. R.A.F.), reattached to R.A.F., and to Victory, for R.A.F. Base, Gosport, for course (April 8), and to *Courageous* (April 18) and to *Furious*, and for 401 Flight, in command (April 21).

Revision of Officers' Emoluments.

THE present percentage reduction (11 per cent.) from the standard rates of officers' pay, additional pay, half-pay and retired pay, will remain unchanged for the six months April 1 to September 30, 1932.

Staff College, Camberley

The undermentioned officers have completed satisfactorily the course at the Staff College, Camberley, which terminated in December, 1931, and they are entitled to the letters "q.s." after their names in the Air Force List:—Wing Com. R. P. Willcock; Wing Com. R. D. Oxland, O.B.E.

Gordon Shephard Memorial Essay

The Gordon Shephard Memorial Prizes for the year 1931 have been awarded by the Air Council as follows:—

First Prize, value £35.—For the essay written by Sqd. Ldr. R. P. M. Whitham, M.C., p.s.a., Directorate of Organisation and Staff Duties, Air Ministry.

Second Prize, value £25.—For the essay written by Sqd. Ldr. J. L. Vachell M.C., p.s.a., Royal Air Force Staff College.

Third Prize, value £15.—For the essay written by Group Capt. C. H. K. Edmonds, D.S.O., O.B.E., p.s.a., Deputy Directorate of Manning, Air Ministry.

Foreign Officers with R.A.F. Units.

LIEUTENANT JAMES Y. FU of the Chinese Military Forces, has been attached to No. 5 Flying Training School as from March 29, 1932, for 11 months' Flying Training Course.

CAPTAIN K. A. W. BRAUNSTEIN and CAPTAIN BJARKOV, of the Danish Army Air Force, have been attached to the Central Flying School from April 1—14, and will then proceed to the Royal Air Force Station, Upavon, until May 31, 1932, in order to study the organisation of and work carried out by a Fighter Squadron.

Comrades of the Royal Air Force.

A BRANCH of the Comrades of the Royal Air Force has been formed, known as the Hounslow, Heston and District branch, with headquarters at the Osterley Hotel, Great West Road, Osterley, Middlesex. The first meeting was held on March 23, at which Air-Com. B. C. H. Drew, G.B.E., C.B.E., R.A.F., was present. Sqdn.-Com. N. Norman, of 601 County of London Bomber Squadron, and of Airwork, Ltd., Heston, is the first chairman. Any ex- or serving member of the R.A.F., or the late R.F.C. and R.N.A.S. will be welcomed. Further particulars from Charles C. Suffield, Hon. Sec., 12, Kings Avenue, Lampton, Middlesex.

MODELS

SOCIETY OF MODEL AERONAUTICAL ENGINEERS (S.M.A.E.)

THE Competition for the Pilcher Cup will be held at Wimbledon Common on Saturday, April 23, at 3 p.m. The Rules are as follows:—

(1) The competition to be an open one. Entrance fee for non-members, 2s. 6d.; affiliated club members, 1s. (juniors 6d.). (2) The competition to be for duration of fuselage models. (3) Any type of power plant may be used. (4) The models must rise from the ground under their own power. (5) The best of three flights to count.

Prizes.—1st, winner to hold cup for one year, silver medal or goods to the value of 10s.; 2nd, bronze medal or goods to the value of 5s.; 3rd, diploma.

Affiliated clubs are asked to please note the Rules for the Farrow Shield Inter-Club Contest:—(1) The Farrow Shield remains the property of the S.M.A.E. (2) Contests for the Farrow Shield to be held annually between affiliated clubs or societies. (3) Each club or society can enter any number of competitors. (4) The models to be of fuselage type and comply with the S.M.A.E. formula. (5) All models shall be hand-launched. (6) The best durations of the three leading models of each club to count. The durations added will give the number of points scored. (7) Competitors will be allowed three flights each, at the discretion of the judges, and the best one to count. (8) No competitor may make a test flight during the competition excepting by permission of the judges. (9) Affiliated clubs will hold these trials on their own ground and be timed by timekeepers approved by the S.M.A.E. (10) Affiliated clubs to arrange the date for this contest and to advise the competition secretary of the S.M.A.E. at least 14 clear days beforehand. (11) Affiliated clubs must send the results to the competition secretary of the S.M.A.E. within 7 days of the contest. (12) No trials shall be held later than October 31.

S. G. MULLINS (Hon. Sec.), The S.M.A.E., 72, Westminster Avenue, Thornton Heath, Surrey.

THE MODEL AIRCRAFT CLUB (T.M.A.C.)

Competition for Scale Models

THIS competition, the first of its kind to take place in this country, was held in the Horticultural Hall on Friday, April 1. Ten models were entered and each was a scale replica of a full-size aeroplane. The rules of the competition were somewhat exacting and a model had to be good to get through the trials. The award of points for resemblance to type, approximate scale measurements, workmanship and finish was made before the flying trials, and revealed two outstanding models, the Westland "Wapiti" (R. J. Bennett) and the A.W.16 Single-Bay Biplane (A. M. Willis), each of which received very high marks.

Name	Model	Resem- blance to Type, etc.	Work- manship and Finish	Take-off stabi- lity Landing	Duration = Points
		Max. 20 points	Max. 25 points	Max. 25 points	
1. R. J. Bennett	Westland Wapiti	48.5	20.0	25.0	12.0
2. A. M. Willis	A.W.16 biplane	47.5	23.5	23.0	7.5
3. R. J. Bennett	Desoutter M.II	37.5	17.7	25.0	17.5
4. R. J. Bennett	S.E.5	40.0	16.0	20.0	8.5
5. J. Pearce	Puss Moth	46.0	20.5	—	—
6. R. J. Bennett	D.H. Moth	45.0	19.5	—	—
7. R. J. Bennett	Gee Bee Sportster	37.5	17.0	—	—
8. L. M. Walker	Heath Parasol	30.0	16.0	—	—
9. G. Bernard	A.W. Atlas M.II	—	—	—	—
10. G. T. Buffery	Fairey monoplane	—	—	—	—

All models were 1/2 in. = 1 ft. scale, except Mr. Walker's Heath Parasol, which was 1 in. = 1 ft.

The flying trials called for skilful handling, the models having to take off and make a perfect flight and landing and to qualify for maximum performance points, and here the "Wapiti" and the Desoutter (R. J. Bennett) were successful.

It was unfortunate that damage in a test flight somewhat affected the flying of the A.W. 16 (A. M. Willis), but more

will be heard of this very fine model when it has been properly tuned up.

A "Puss Moth" entered by J. Pearce and sent down from Manchester for the competition was a fine piece of workmanship. The propeller was broken in a test flight and prevented it from taking any further part in the competition.

The "Wapiti" eventually turned out to be the winner by a narrow margin of points over the A.W.16.

A Matter of L.S.D.

In Gieves, Ltd., advertisement in our issue of April 8, it was stated by an error that Gieves' Flying Goggles, Meyrowitz New Pattern "Number Ten" Luxor, were 45s.—this price, it should be noted, ought to have read 50s.

PUBLICATIONS RECEIVED

Economic Conditions in the Argentine Republic. October 31, 1931. Report by K. Jopson, M.B.E. Department of Overseas Trade, No. 505. London: H.M. Stationery Office, W.C.2. Price 4s. net.

Marlborough's German Technical Words and Phrases Dictionary. London: E. Marlborough & Co., Ltd. Price 7s. 6d. net.

"Stocksbridge" Alloy Steels. Samuel Fox & Co., Ltd., the United Steel Companies, Ltd., 17, Westbourne Road, Sheffield.

NEW COMPANIES REGISTERED

COVENTRY (CIVIL AVIATION), LTD.—Capital £500, in £1 shares. Acquiring the assets of the unincorporated association known as the Coventry Aero Club, to promote and assist aerial navigation and locomotion, etc. Secretary: H. T. Jackson. Solicitors: Sidney F. Snape and Co., 105, Little Park Street, Coventry.

BRITISH AIR TRANSPORT, LTD., Room 4, Central Hall, Air Port of London, Croydon.—Capital, £5,000 in £1 shares. Acquiring the business of instructors in aviation and aerial navigation carried on by W. F. Jennings and W. G. Laidlaw at Room 4, Central Hall, Air Port of London, Croydon. Directors:—W. F. Jennings, "Westdene," Burdon Lane, Cheam, Surrey, governing director and chairman. W. G. Laidlaw, The Bunzalow, Berry Head Road, Brixham, Devon. W. F. Anderson, 91, Coombe Road, Croydon, aviator.

Increase of Capital

WIGHT AVIATION, LTD., Shanklin, I.W.—The nominal capital has been increased by the addition of £15,000 in £1 ordinary shares beyond the registered capital of £2,500.

AERONAUTICAL PATENT SPECIFICATIONS

(Abbreviations: Cyl. = cylinder; i.c. = internal combustion; m. = motors. The numbers in brackets are those under which the Specification will be printed and abridged, etc.)

APPLIED FOR IN 1930.

Published April 14, 1932.

- 37,368. E. OEHMICHEN. Devices for propulsion and lift of aircraft. (369,248.)
- 37,411. H. H. PLATT. Heavier-than-air type of aircraft. (369,249.)
- 37,929. H. R. RICARDO. I.c. engines of liquid fuel injection type. (269,229.)

APPLIED FOR IN 1931.

Published April 14, 1932.

- 8,667. W. SWIATECKI. Bomb suspensions for aircraft. (369,397.)
- 17,009. H. JUNKERS. Hollow-metal screw propellers. (369,478.)
- 17,844. H. G. OSTBERG. Synchronising devices for aircraft machine guns firing through the propeller field. (369,483.)
- 19,914. M. CHARLES. Brake wheels for aeroplanes. (369,497.)
- 29,333. E. OEHMICHEN. Devices for propelling and lifting aircraft. (369,237.)

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